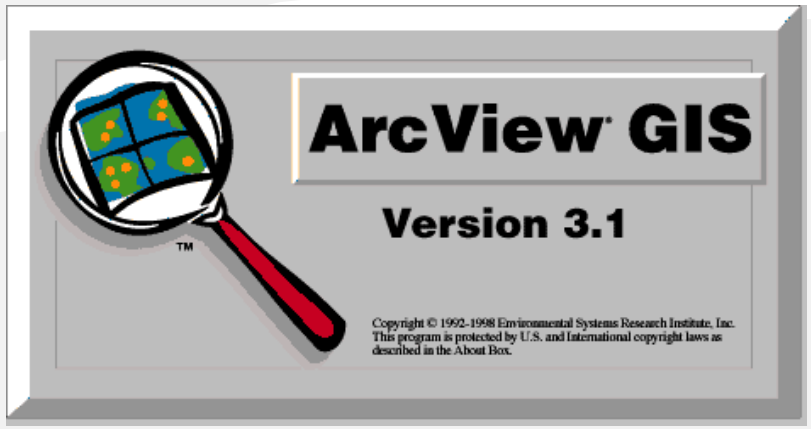
USDA Farm Service Agency

ArcView Training



ArcView Training

- Welcome and Introductions
- Lab Rules and Regulations
- Class Structure - Exercises and Lectures
- Miscellaneous - Restrooms, Breaks, Parking, Lunch

ArcView Training Goals

- Gain user confidence in everyday ArcView activity.
- Understand ArcView terminology.
- Become proficient in ArcView tasks set forth by the users office.
- Instill ArcView knowledge in the “chosen” office employees, allowing them to teach any other office staff.

ArcView Training Expectations

What will you learn?….

- ArcView Interface/Terminology
- How to Create ArcView Projects
- How to Access ArcView's Help System
- How to Customize Projects and Maps
- How to Query, Display, and Print Maps
- How to Manipulate, Analyze, and Update ArcView Data Sources
- How to Identify Potential ArcView Data Sources

ArcView Training

GIS Defined

Geographic Information System

• A software program that integrates spatial data (maps) with tabular data (databases).

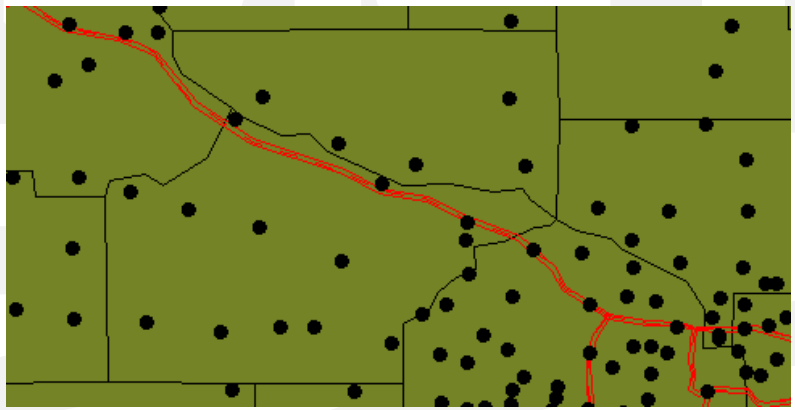
•A database with a map component.

• Each record in a spatial database has a shape as part of it's attributes.

• This allows spatial entities (points, lines, or polygons) to have "intelligence".

ArcView Training

GIS Defined



Spatial Component:
Polygons, Lines, or Points

Tabular Component:
A Database with
Records and Fields

Point	St. Anthony	city	MN	27	3362	30	81	1
Point	St. Bonifacius	city	MN	27	3365	418	1180	4
Point	St. Charles	city	MN	27	3370	1037	2642	5
Point	St. Clair	city	MN	27	3375	234	633	3
Point	St. Cloud	city	MN	27	3380	18828	48812	6
Point	St. Francis	city	MN	27	3382	800	2538	5
Point	St. Hilaire	city	MN	27	3385	130	298	2
Point	St. James	city	MN	27	3390	1881	4364	5
Point	St. Joseph	city	MN	27	3395	759	3294	5

ArcView Training

What is ArcView?

ArcView is a Spatial Data Browser

It has…

- Data Analysis Capabilities
- Programming Abilities Using Avenue (Allows for customizing projects)
- Spatial and Attribute Queries
- Results in Quality Output (screen and print)

ArcView Training

What can ArcView do?

ArcView Capabilities:

- Integrate Spatial and Attribute Data
- Create and Modify Spatial and Attribute Data
- Create Graphs, Charts, and Statistical Summaries
- Link with other Window-Based Applications

ArcView Training

Things to Know Before You Start

- All ArcView work is done within the context of a “project”
- This work is saved in a Project File that has an .APR extension
- The project file organizes and stores the status of it’s windows and the data displayed in them
- Only one person can work in a project at a time
- The project does not house the data, only its representation or location
- When you first start ArcView, you will be presented with the standard new default project
- Projects are opened, saved, and closed using the FILE menu option
- The Project Window organizes ArcView documents

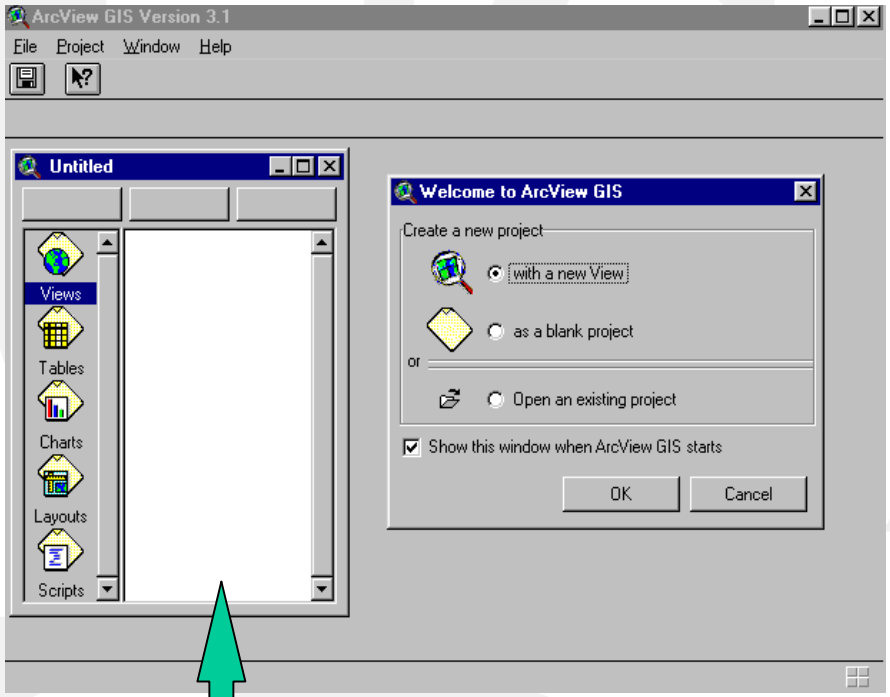
ArcView Training

Exercise #1 - ArcView

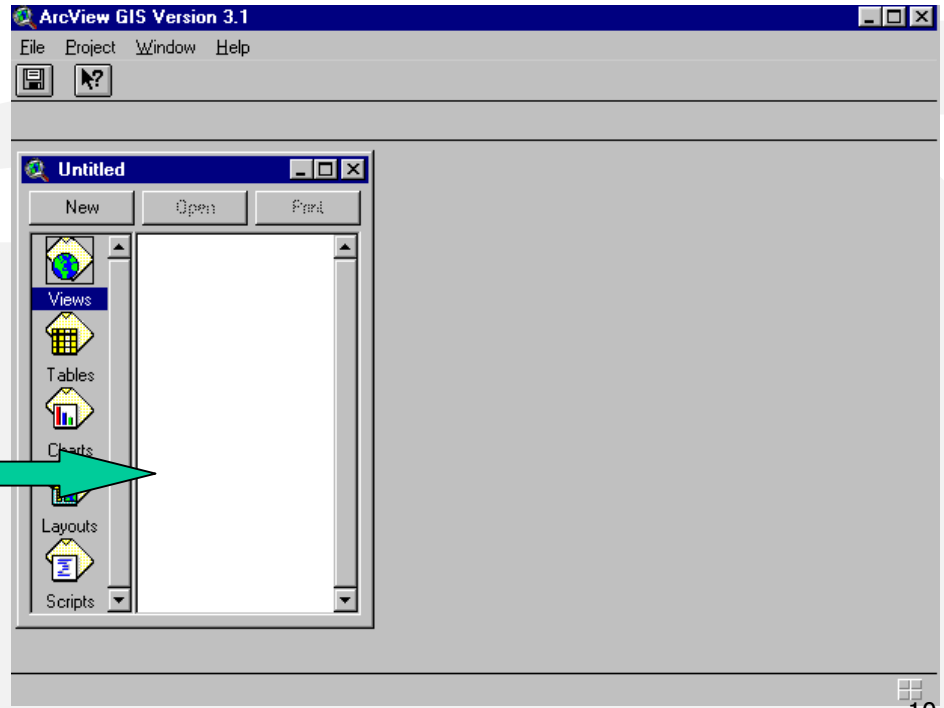
What you will learn:

- How to Start and Stop ArcView
- How to Open, Close, and Save a Project
- How to use the Project Window to identify what documents are present
- How to use the ArcView HELP System

Default Project (Untitled)



The Project Window



ArcView Training

Document Types

- ArcView supports the display of a single data set in many different forms.
  - Such as maps, tables, graphs, pictures, etc.
- Viewing data in different formats allows us to identify information from our data.
- Each data type is displayed in it's own "Document Window".
- There are five types of ArcView Document Windows.

ArcView Training

ArcView Document Types

1) **View Document:** Interactive map displays of spatial data, (maps).

2) **Table Document:** Data tables which may or may not be attached to a map.

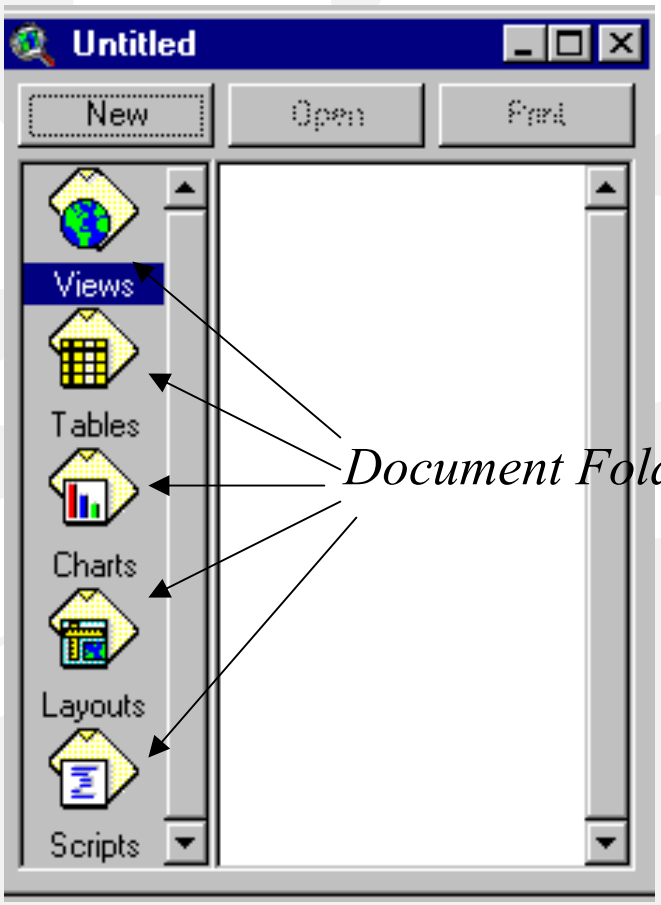
3) **Chart Document:** Charts, Graphs, etc.

4) **Layout Document:** Map Composition.

5) **Script Document:** Avenue Program Code.

ArcView Training

Document Types



- The Project Window has a folder for each type of document
- This helps to organize the many documents that can exist in an ArcView Project
- To create new documents, select a type and click on the New Button

ArcView Training

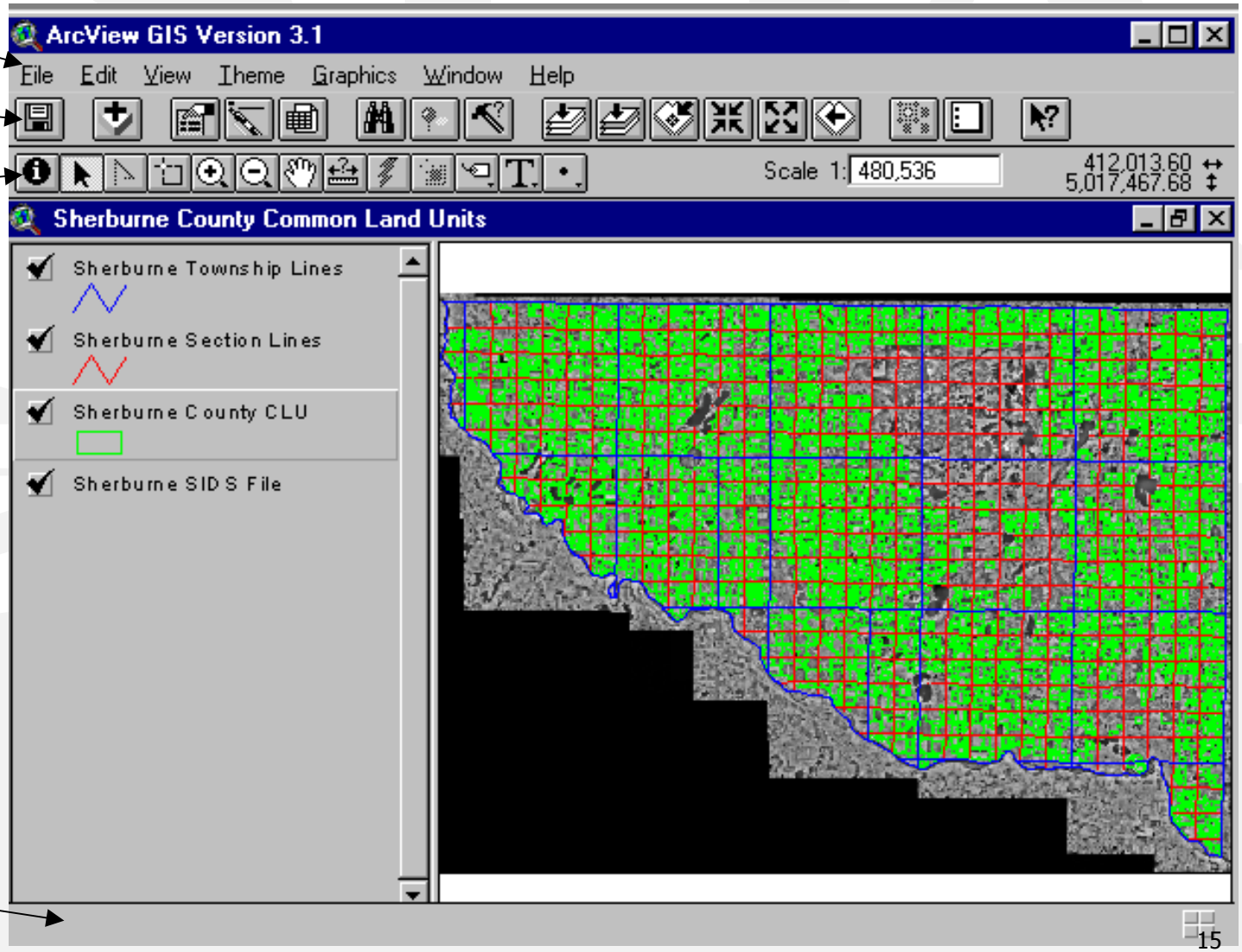
ArcView Interface

There are four specific components in the ArcView Interface:

1) **MENU Bar -** Pull-down menu access to ArcView commands
2) **BUTTON Bar -** Push button access to ArcView commands (shortcuts)
3) **TOOL Bar -** Defines the action the Screen Cursor is to perform
4) **STATUS Bar** - Displays menu descriptions, measurements, and processing progress

ArcView Training

ArcView Interface



ArcView Training

ArcView Interface: Tips

- The interface options change based upon which document is active.

- If you do not recognize a tool or menu you know exists, you probably have the wrong document active.

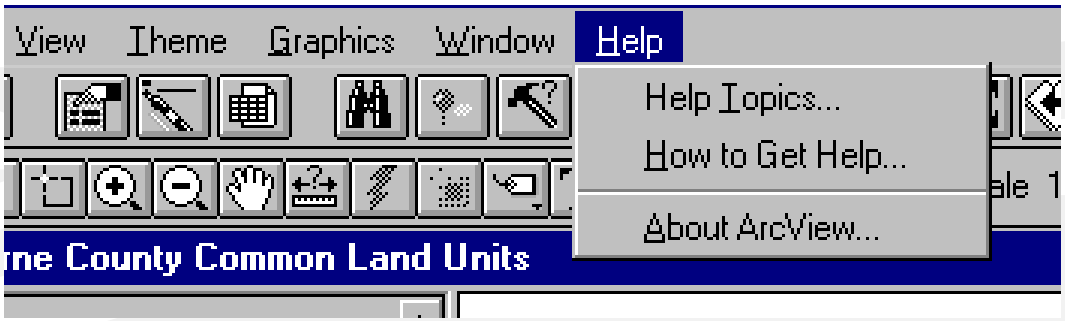
- Try to keep the ArcView screen as uncluttered as possible.

- Close document windows that you do not need open.

ArcView Training

The **HELP** Menu

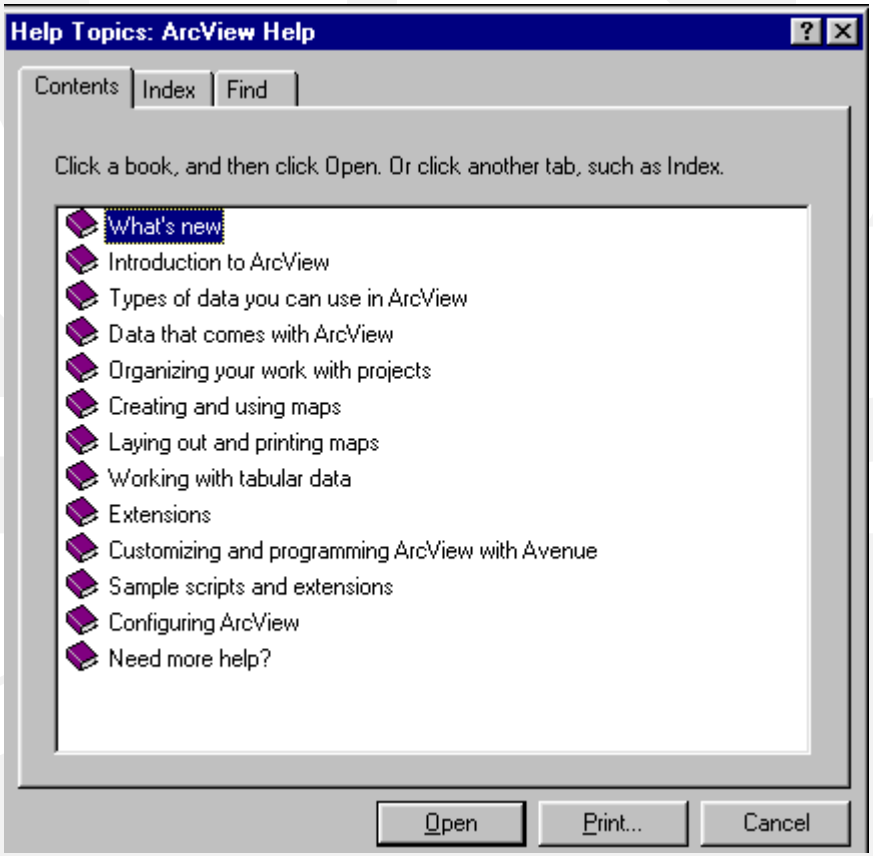
- Help can be found in every document.
- ArcView has an extensive on-line Help Library.
- Use the Help menu to get at the total contents.

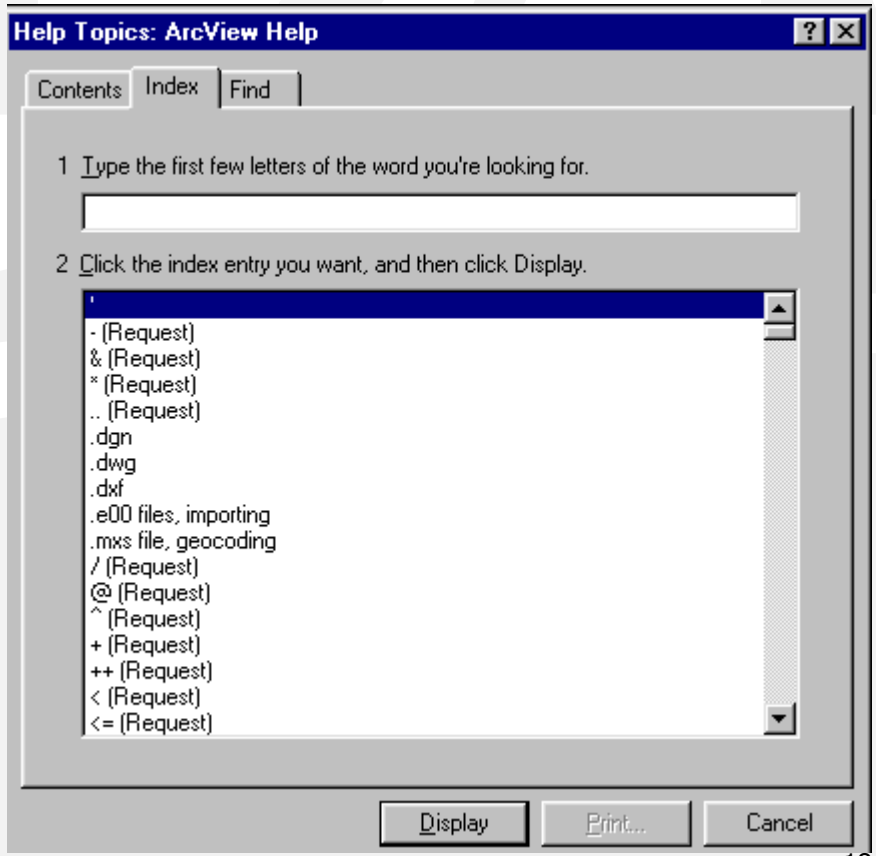


- Use the Help Button  to get help about a particular menu, button, or tool.
- It is important to know ArcView terminology to perform effective searches.

ArcView Training

Searching the HELP Menu





ArcView Training

Help Menu

ArcView Help Tips:

- Use the HELP system!!!

- Don’t get frustrated, using HELP will improve your ArcView proficiency over time!

- It may be helpful to print out the Help Documents that have the most benefit to the user.

- Use Bookmarks to get to topics you use frequently.

ArcView Training

Exercise #2 - The View

What you will learn:

Add a View to the Project

Setting View Properties

- View Name
- View Map Units
- View Display/Reporting Units
- Comments

Further develop your use of the HELP system

ArcView Training

The View Document

- The View Document is the interactive map display window in ArcView that lets you display, explore, query, and analyze geographic data.

- Technically, the View defines the geographic data that will be used and how it will be displayed, but it does not contain the geographic data files themselves, it contains the reference to the locations of the files.

- This allows the View to reflect the current state of the data.

ArcView Training

The View Document

The View is comprised of two parts:

1) **Table of Contents -** Also called the legend. A list of the themes that have been added to the View.

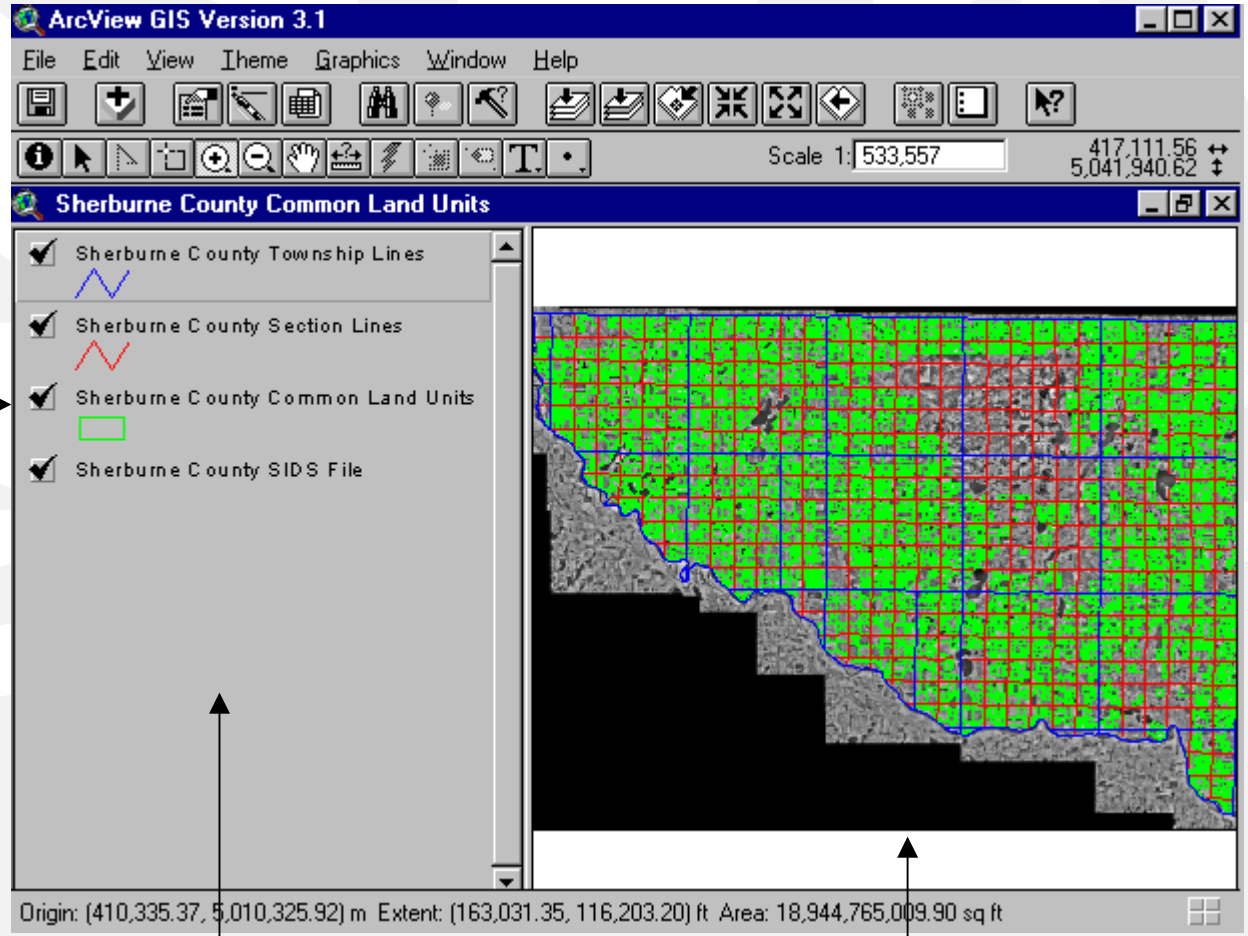
2) **Map Display Canvas -** This displays the data in its geographic form.

A Project can contain one or more View Documents.

A View can contain one or more Themes which can be created from a variety of data sources (images, tables, coverages, etc.).

ArcView Training

The View Document



Theme Legend

Table of Contents

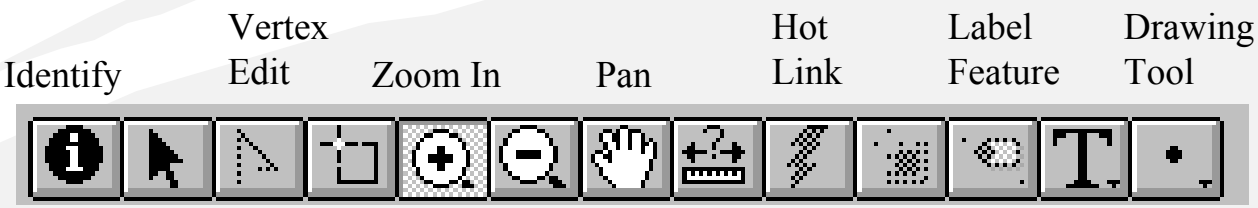
Map Display Canvas

ArcView Training

The View Document Interface

The Button Bar

The Tool Bar - These tools work when the cursor is on the View Document



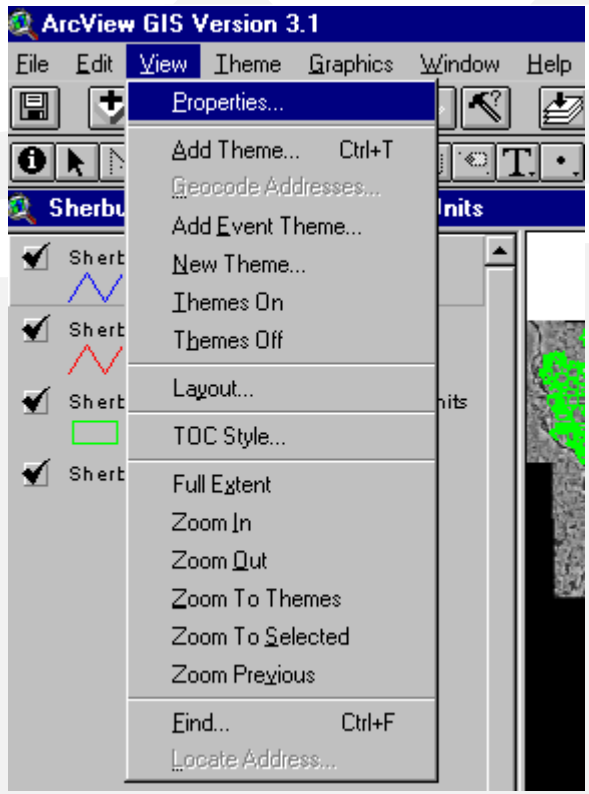
ArcView Training

View Document Interface

View Scale

View Coordinates of the Cursor

Menu Bar - Each word is a *Pull-down menu* with various options contained within it.



Many of these options are repeats of the button and tool bars. Use your help menu to learn more about them.

ArcView Training

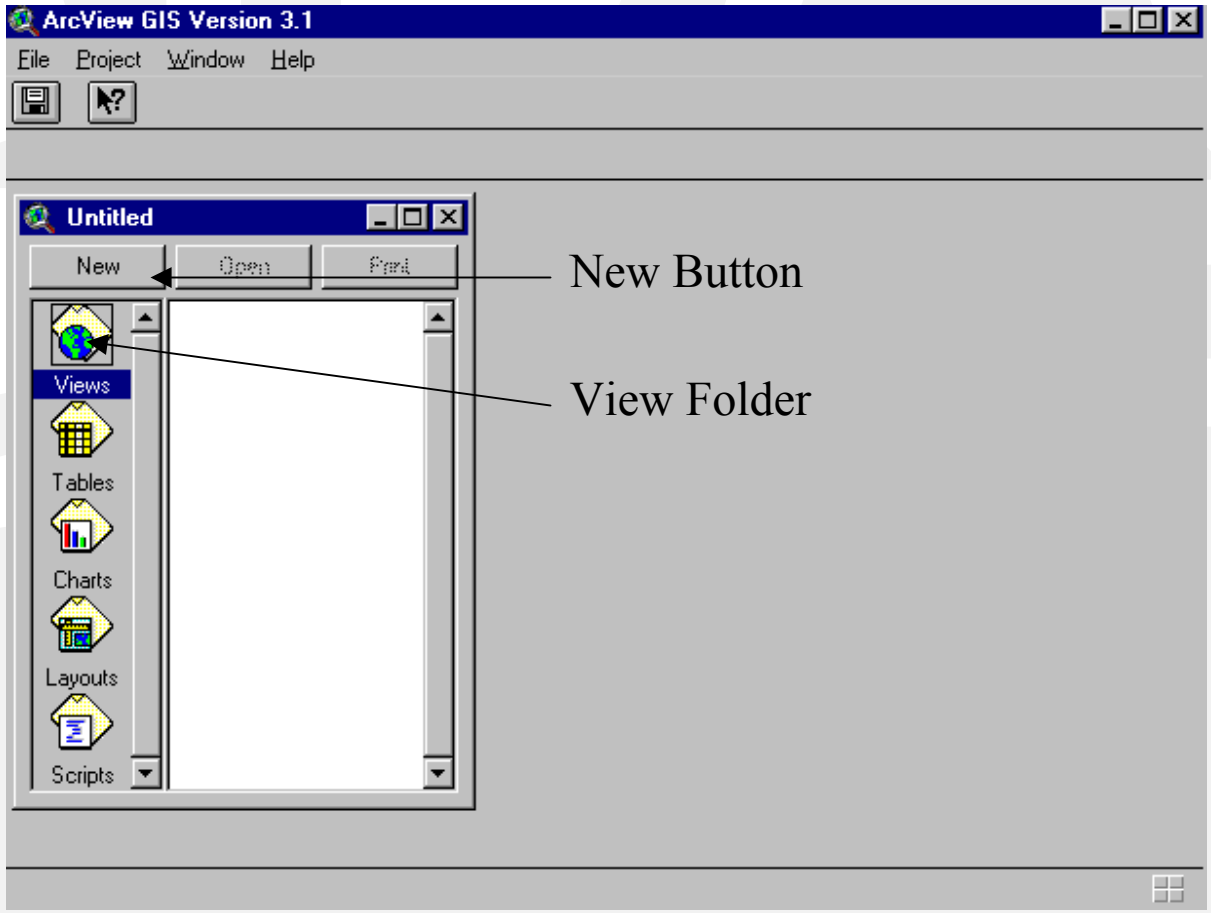
The View Document

Creating a View

Two Methods

1) Make sure the View Folder is the active folder in the Project Window. Then press the New Button at the top.

2) Double click on the View Folder



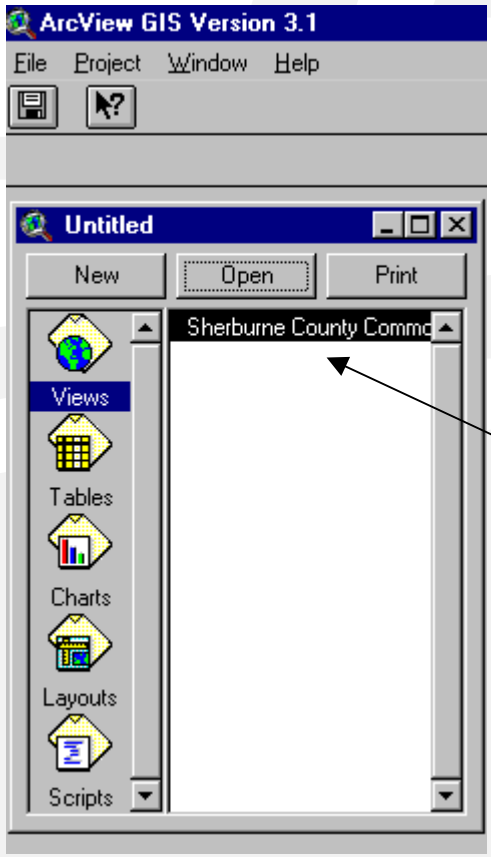
ArcView Training

The View Document

Opening an Existing View

- Make sure the View Folder is the active folder in the Project Window
- All of the views in that project will show up on the right side of the Project Window
- Select the view of interest and press the Open Button, or double click the View name

(To delete the View, press the Delete Key. This will not delete any data.)



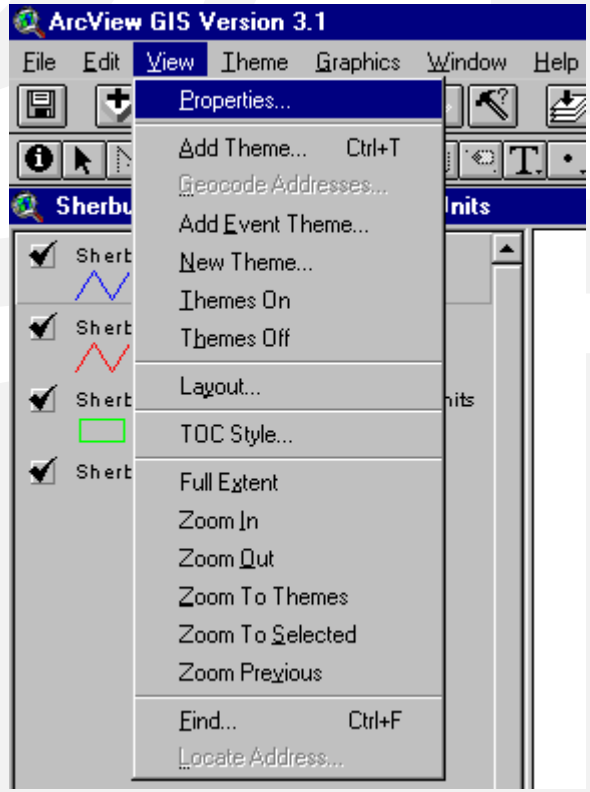
ArcView Training

The View Document

View Properties:

- Every View has a "Property Sheet" that defines important data characteristics specific to that view. ArcView uses these parameters for a variety of command functions.

- To access the View Property Sheet, use the VIEW menu pull-down. Select the *Properties* option.



ArcView Training

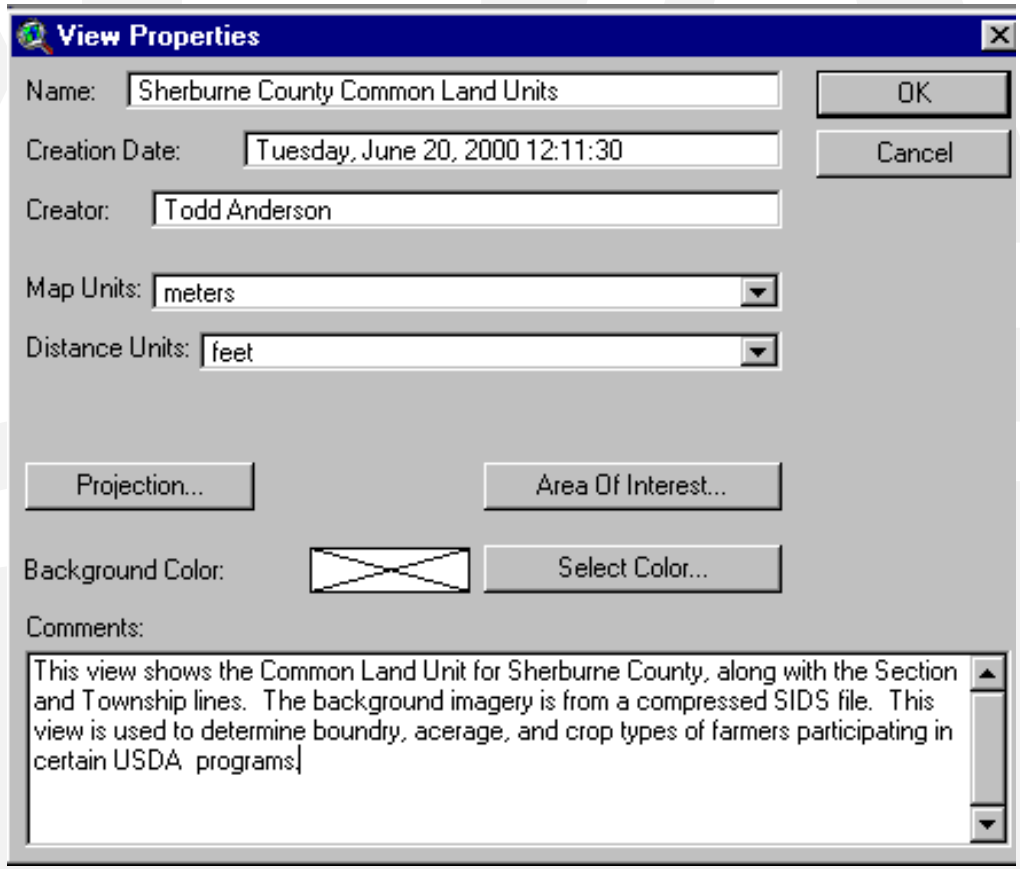
View Properties Sheet

The **NAME**, **CREATION DATE**, and **CREATOR** are changed as needed.

Map Units are the Data Coordinate Units, (meters for UTM).

Distance Units are the displayed measurement units.

Comments section is there to create and have on-line documentation for reference.



ArcView Training

Exercise 3 - Theme Basics

What you will learn how to do:

- Add/Remove themes to or from your View Document
- Work with Themes using the View Document Interface
- Copy/Cut/Paste Themes
- Set Theme Properties
- Open a Theme Attribute Table
- Identify different data types

ArcView Training

Themes

- A Theme is an individual map layer displayed in a View Document
- Themes display points, lines, or polygons
- Themes can be created from the same spatial data set, depending what you want represented
- Themes have a legend which is used to control things like classification, symbol representation, and legend text
- Themes are displayed in the table of contents of the View Document

ArcView Training

Themes

• When in a View, a Theme can be turned “on” or “off” by clicking on the check box, in the table of contents

• Themes are made “Active” by selecting them in the Table of Contents (hold the shift key down to make more than one theme active)

• The first theme to be drawn on the canvas will be the lowest one in the table of contents

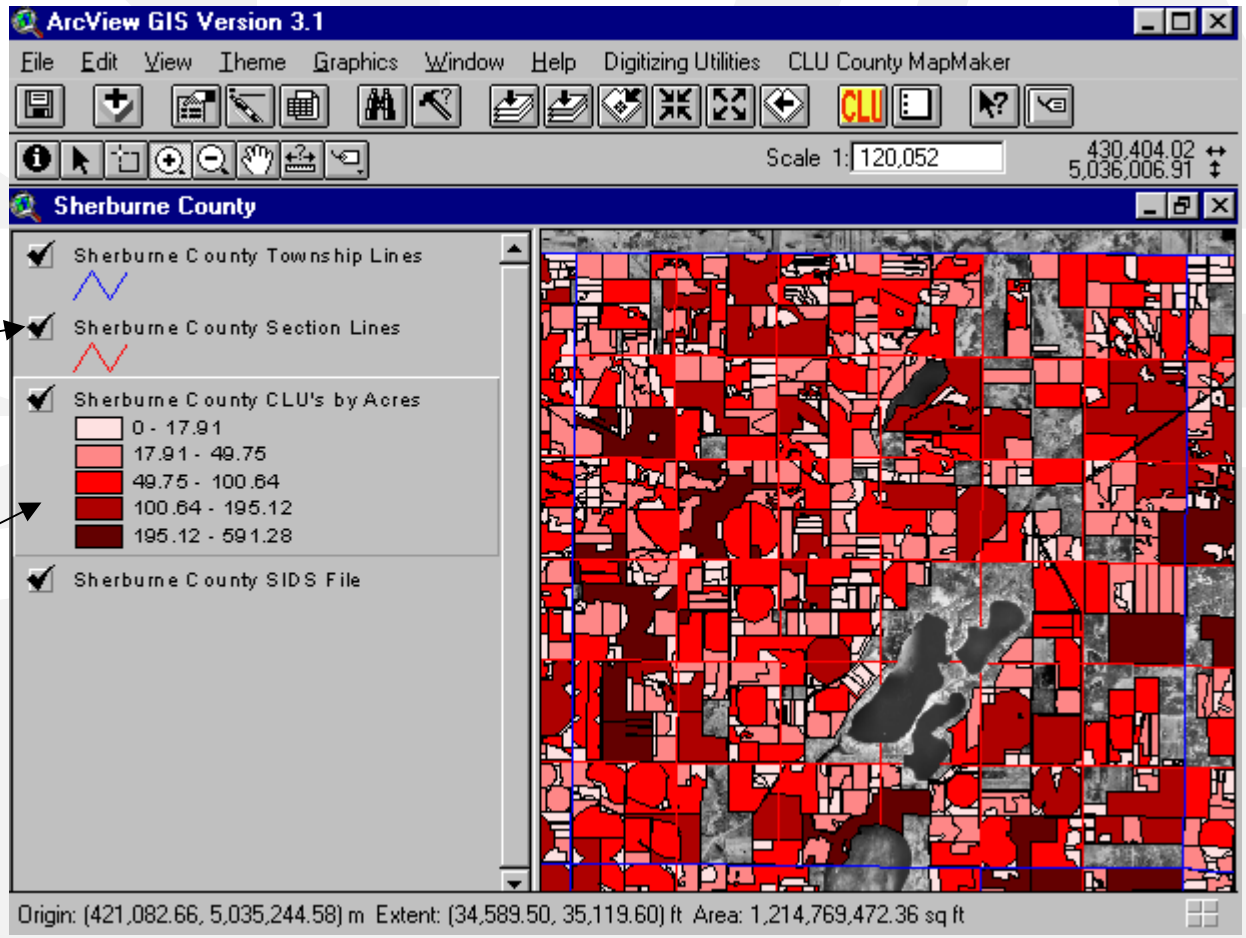
• You can click and drag the theme legends to change the order of the themes

ArcView Training

Themes

Turn Themes On or Off by clicking this check box

Active Theme



ArcView Training

Themes

Where do Themes come from?

- They are generated from spatial data sets

- ArcView will support these types of spatial data
  - ArcView Shapefiles (Native data format)
  - Arc/Info Coverages and Grids
  - Arc/Info Export Files
  - Delimited Text files that contain coordinates
  - Various Image Formats
  - AutoCAD Files

  (Most common files are the shapefiles and image files, which will be what you encounter)

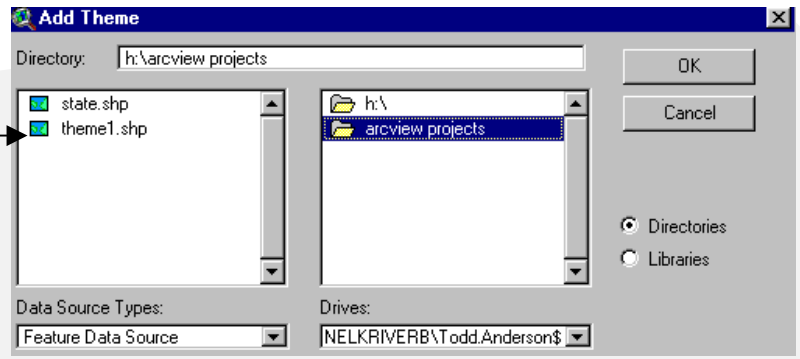
ArcView Training

Themes

Theme Data Sources - Shapefiles

- Shapefiles are ArcView's native data format
- A shapefile is composed of three main data files with .SHP, .SHX, and .DBF extensions
- Shapefiles can only store one feature class at a time (point, line, or polygon)

Only the .shp file is seen in ArcView Add Theme



All three files are seen in Microsoft Explorer

state.dbf	38KB	DBF File	3/6/00 10:12 AM
state.shp	27KB	SHP File	3/6/00 10:07 AM
state.shx	1KB	SHX File	3/6/00 10:07 AM
theme1.dbf	11KB	DBF File	3/6/00 10:16 AM
theme1.shp	7KB	SHP File	3/6/00 10:10 AM
theme1.shx	1KB	SHX File	3/6/00 10:10 AM

ArcView Training

Themes

Theme Data Sources - Image Files

- ArcView will support the display of a variety of image types as themes

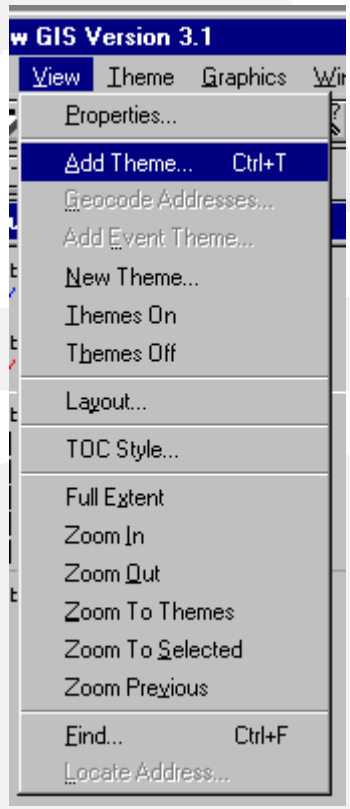
- Valid Image types
  - TIFF
  - ERDAS Imagine and GIS Files
  - Satellite Imagery (BIL, BIP, BSQ)
  - JPEG
  - SIDS
  - GIF

ArcView Training

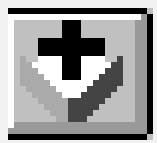
Themes

The process of placing a Theme in a View is called *Adding A Theme*

When you have a View open, you add themes using the VIEW menu pull-down and choose the *Add Theme* option



Or you could just use the Add Theme Button



ArcView Training

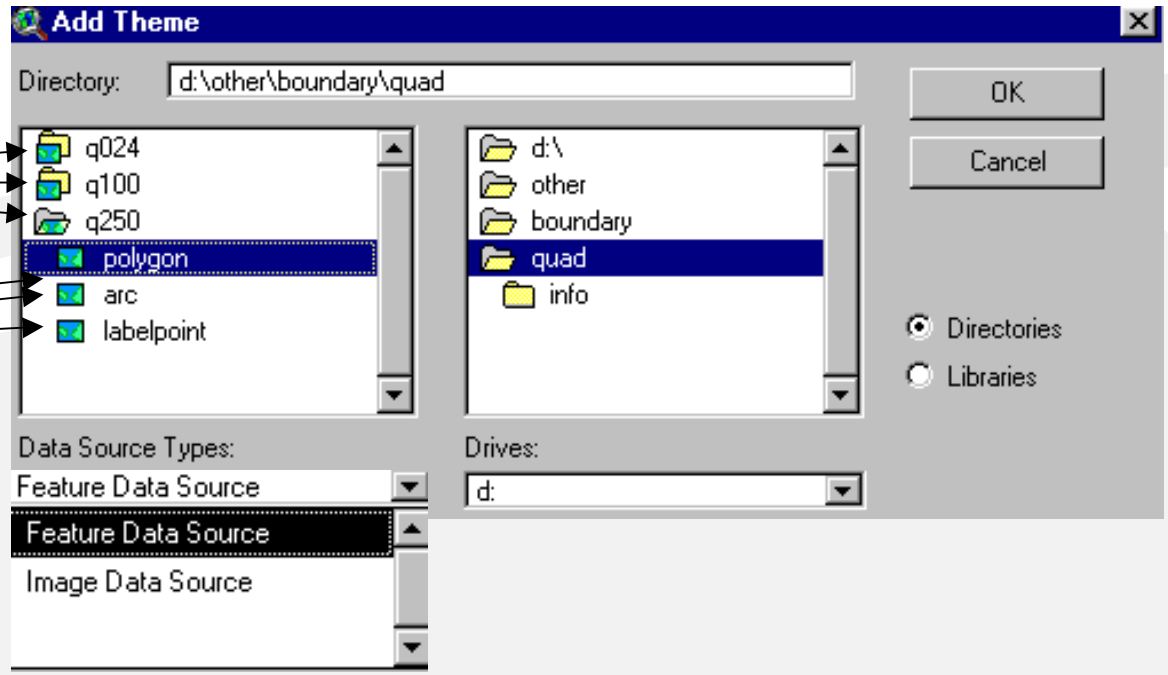
Themes

When you get the Add Theme dialog box, you will need to select the data you want to display

Geographic Data Folder

Theme Data Type

Data Source Options



ArcView Training

Themes

The Geographic Folder  indicates the presence of multiple geographic feature types for this data

When you click on the Geographic Folder, the different Theme Data Types  (feature type) appear

Only one feature type can be selected per theme

Remember to change the Data Source to Image when looking for a Image File to bring in as a theme

ArcView Training

Theme

Theme Feature Types

- Polygons - Area Features
- Label Points - Area Feature Labels
- Point - Point Features
- Line - Linear Features
- Region - Multi-Polygon Features
- Routes - Linear Networked Features
- Annotation - Text

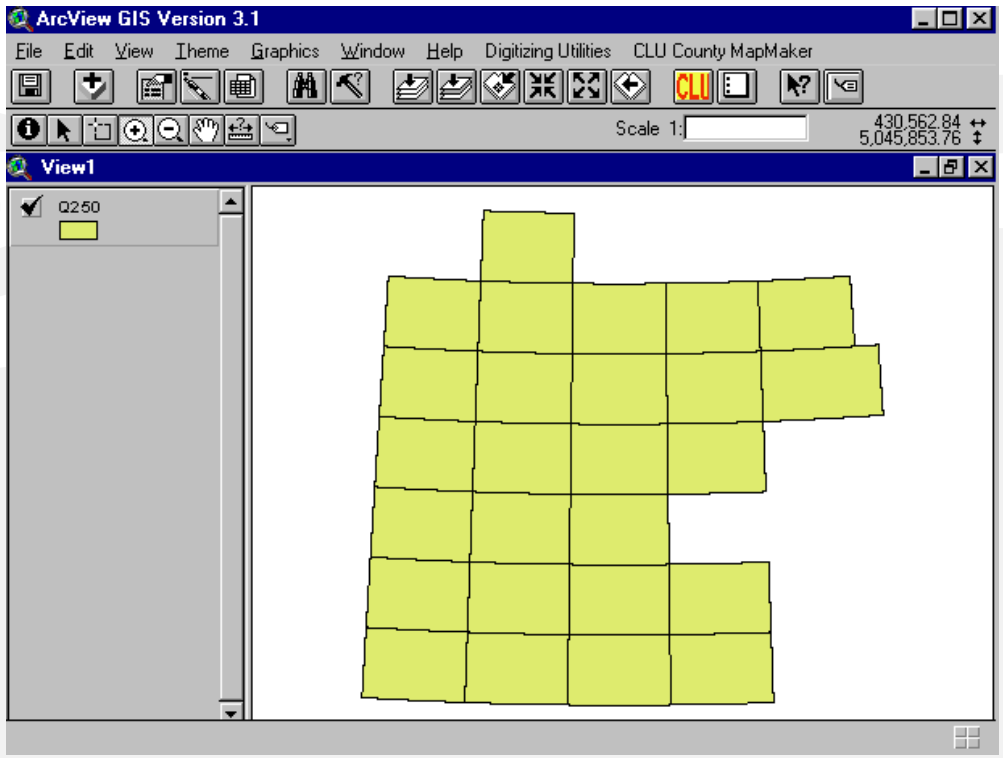
(The last three will not be used very often.)

ArcView Training

Themes

Adding Themes

Once a Theme has been added to the View, it will be active and always displayed using the default Simple Legend and the Theme Name will default to it's file name.

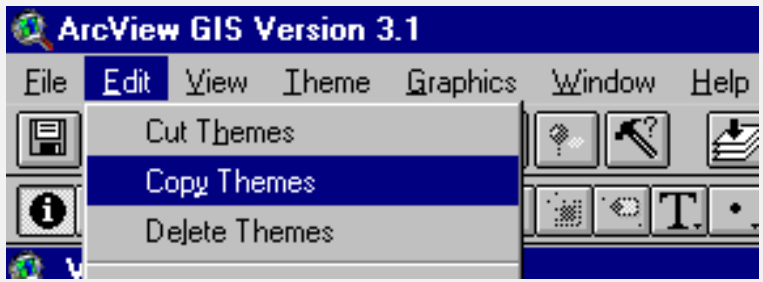


ArcView Training

Themes

Manipulating Themes

- Make the Theme or Themes active that you want to manipulate
- Choose the EDIT menu drop-down for these selections:
  - CUT option will remove the themes and put them into the clipboard
  - COPY option will put a copy of the themes into the clipboard
  - DELETE option will remove themes from the project permanently
  - PASTE option is used to place themes from the clipboard to a View



ArcView Training

Themes

The Tools on the View Document Interface are designed to work with Themes.

You will be able to Zoom, Pan, Get Information, Select, and Label by using these Tools.

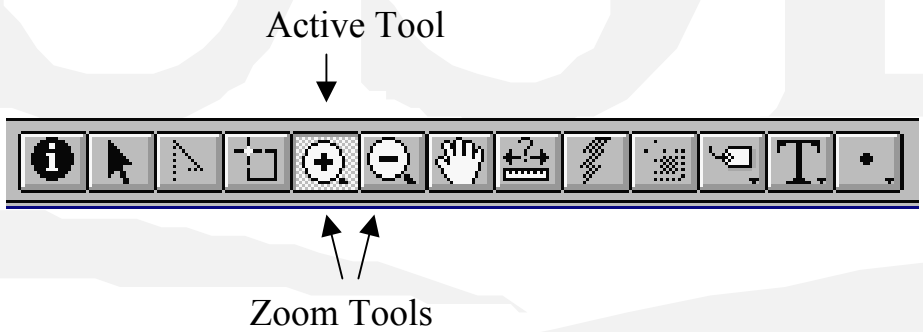
The Tools will remain as the selected option until the user changes the selection.

The selected tool works only when the cursor is used in the View Document's View Display Canvas.

ArcView Training

Themes

Theme Navigation: Zooming Around



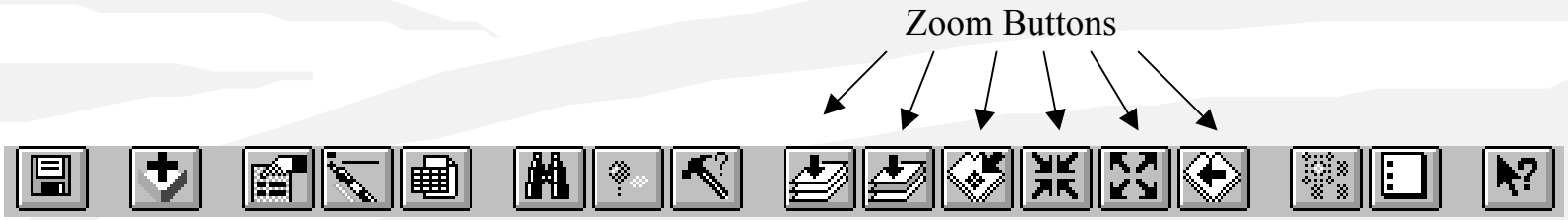
With the Zoom Tools, either click once or click, hold, and drag the mouse to form a box around whatever you want to zoom in to. The plus sign indicates a zoom in function, and the minus sign indicates a zoom out function.

ArcView Training

Themes

Theme Navigation: Zooming Around

- Each data file contains features for a limited geographic area called its extent.



The buttons zoom to the Views extent, an active themes extent, selected features, in, out, and previous extent. You do not need to be in the view document canvas to use these buttons. Just click on them and the function will take place.

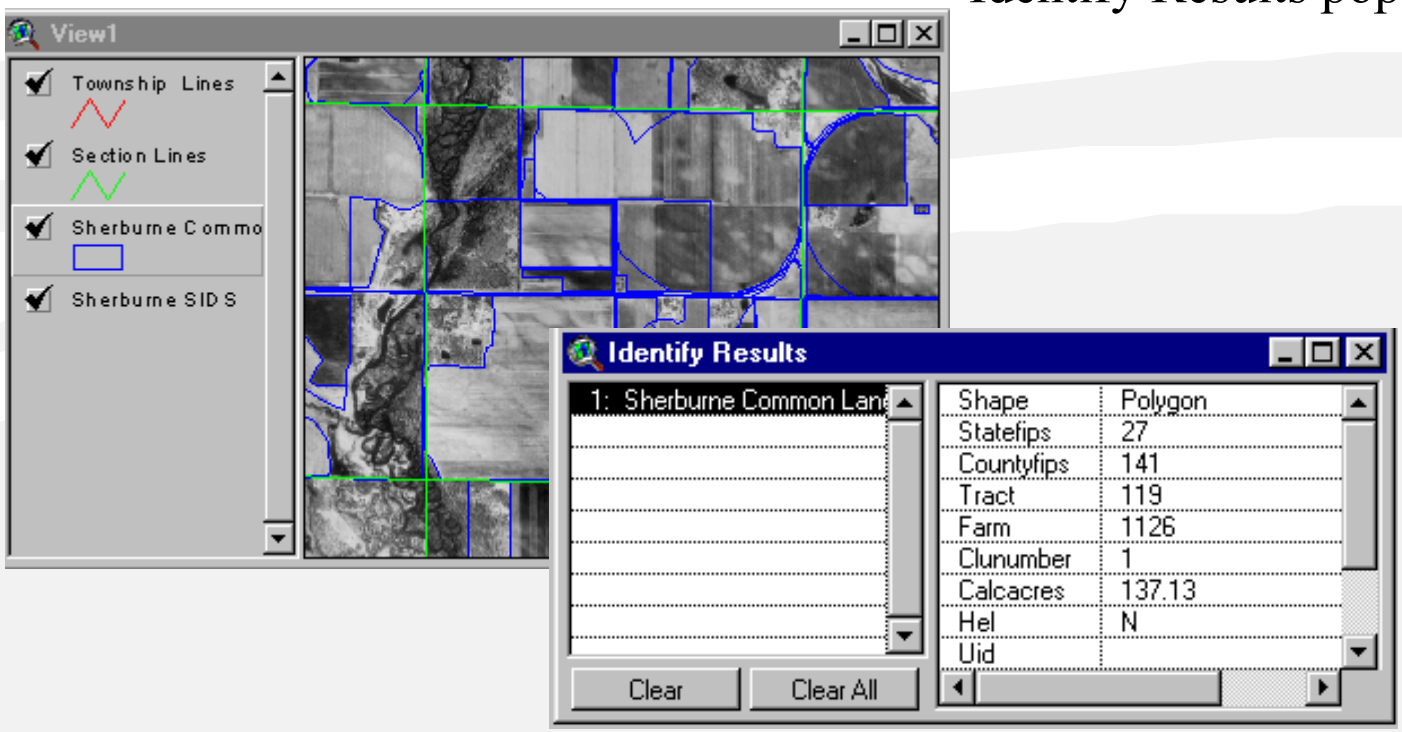
ArcView Training

Themes

Theme Navigation: Identify

Identify Tool

By selecting a feature with the Identify Tool, the attributes of the selected feature appear in a Identify Results pop-up box.

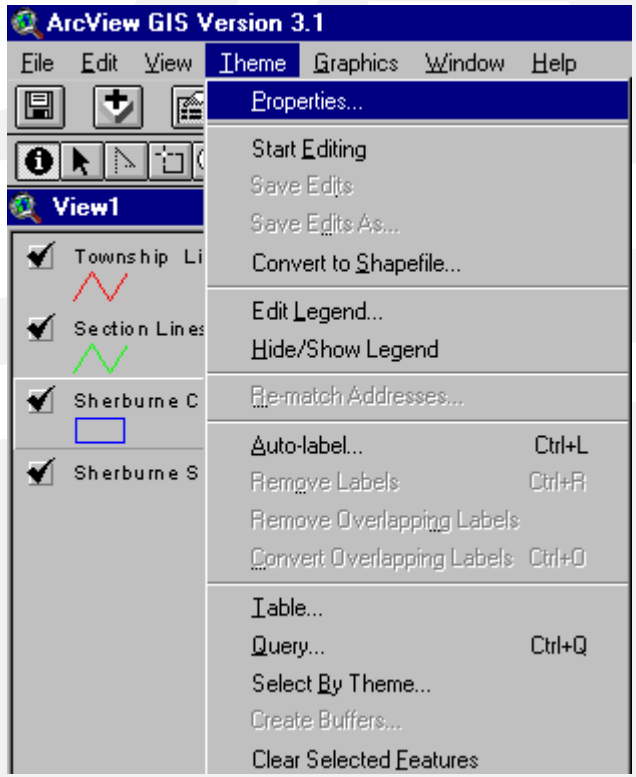


ArcView Training

Theme Properties

- Every Theme has a “Property Sheet” that will store and define data characteristics specific to that Theme.

- Access the Theme Property Sheet by using the THEME pull-down menu and selecting the ***Properties*** option.

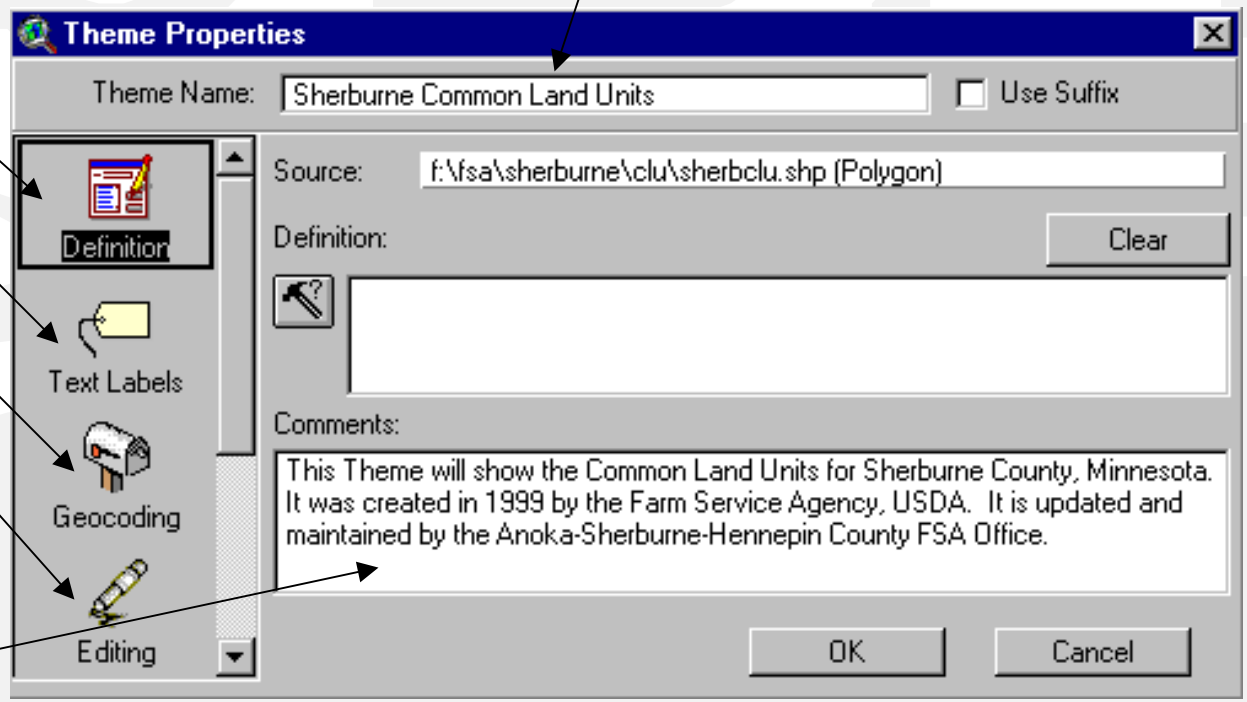


ArcView Training

Theme Properties

One Theme has many Properties that can be set. These icons represent the different Properties that can be changed for each Theme.

You can change the Theme name here



The Comments section helps to document the origin, purpose, and anything that is important to note about that Theme.

ArcView Training

Theme Properties

There are a number of Properties you can set for a Theme

- Theme Definition
- Text Labeling
- Geocoding
- Theme Editing (Snapping)
- Scale Dependant
- Theme Hot-Links
- Theme Locking

ArcView Training

Theme Attribute Tables

Most Themes, being geographic data, have tables that store attribute data related to the features (points, lines, and polygons) on the map.

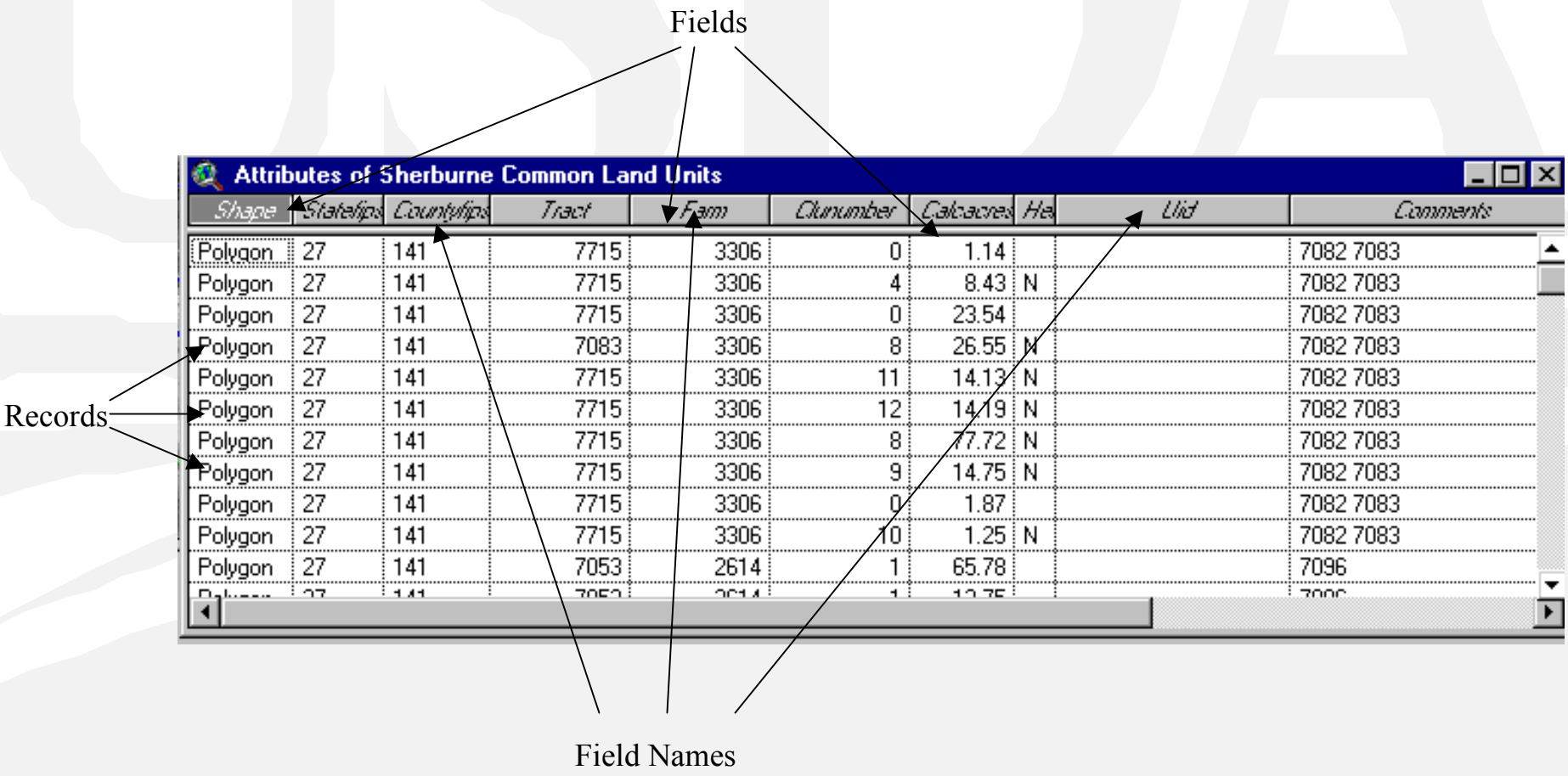
Tables are comprised of **records** (rows) and **fields** (columns).

Each feature in the theme has only one record associated with it.

Fields store the attributes, or characteristics, of the individual feature.

ArcView Training

Theme Attribute Tables



Shape	Statefips	Countyfips	Tract	Farm	Clunumber	Calcacres	Hel	Uid	Comments
Polygon	27	141	7715	3306	0	1.14			7082 7083
Polygon	27	141	7715	3306	4	8.43	N		7082 7083
Polygon	27	141	7715	3306	0	23.54			7082 7083
Polygon	27	141	7083	3306	8	26.55	N		7082 7083
Polygon	27	141	7715	3306	11	14.13	N		7082 7083
Polygon	27	141	7715	3306	12	14.19	N		7082 7083
Polygon	27	141	7715	3306	8	77.72	N		7082 7083
Polygon	27	141	7715	3306	9	14.75	N		7082 7083
Polygon	27	141	7715	3306	0	1.87			7082 7083
Polygon	27	141	7715	3306	10	1.25	N		7082 7083
Polygon	27	141	7053	2614	1	65.78			7096

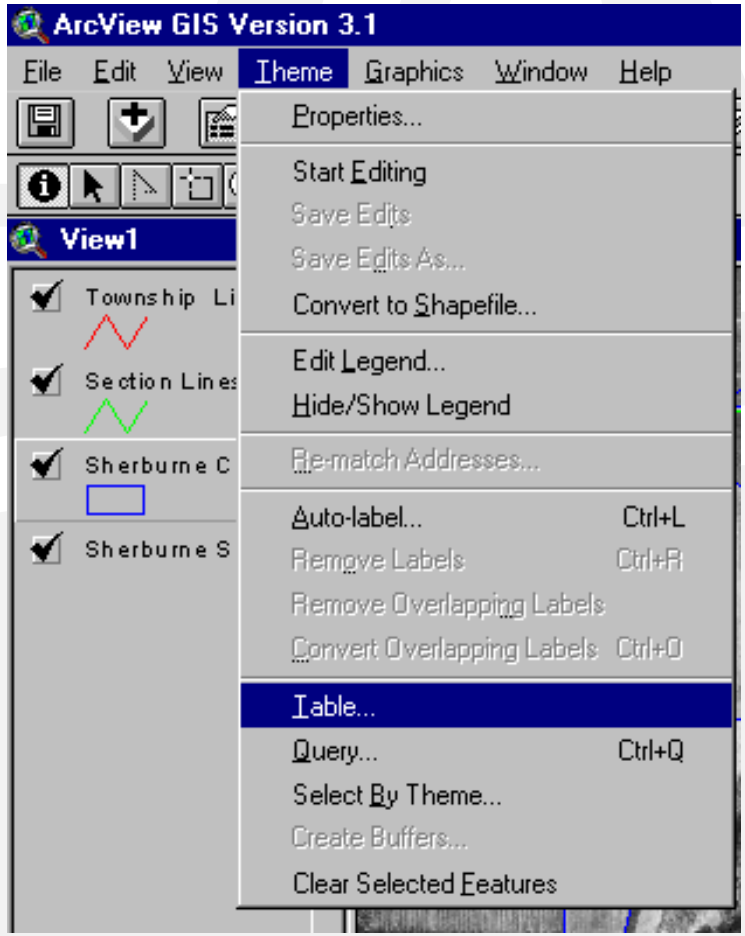
ArcView Training

Theme Attribute Table

Access the Attribute Tables by using the THEME menu drop-down and selecting the ***Table*** option.

Pushing the Open Theme Table Button  on the button bar, also opens the Attribute Table.

Either way will only open the table for the Active Theme in the View.



ArcView Training

Training Data Sets

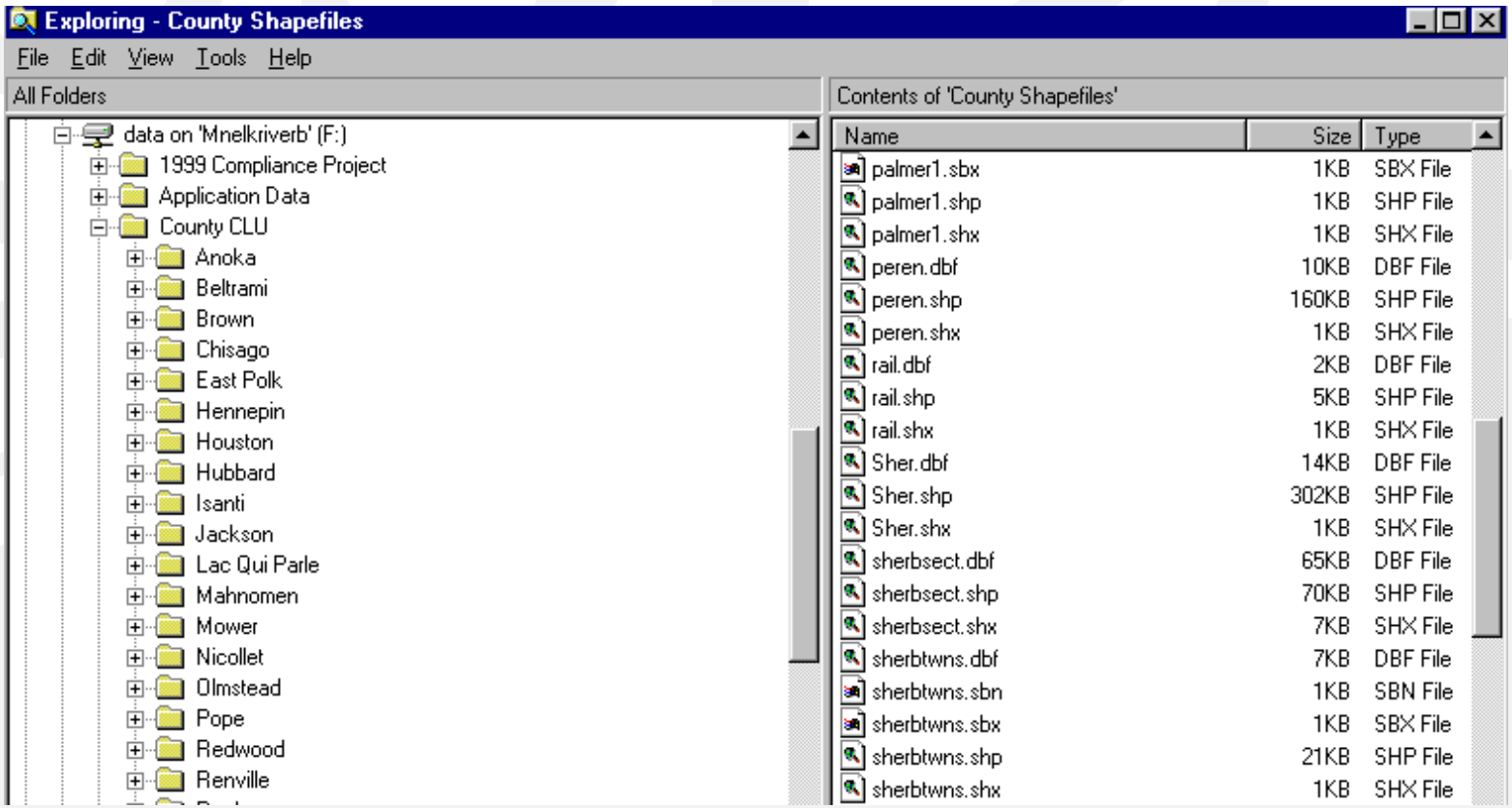
You will now be working with exercises that use data from the Sherburne-Anoka-Hennepin County FSA Office. The Shapefiles and Imagery are of Sherburne County, MN and Palmer Township in Sherburne. The following is a list of the files:

- Clipped Shapefile of Sherburne Townships
- Clipped Shapefile of Sherburne Sections
- Shapefile of Sherburne County Common Land Units
- .TIFF file of Palmer Township
- .SIDS file of Sherburne County

ArcView Training

Shapefiles

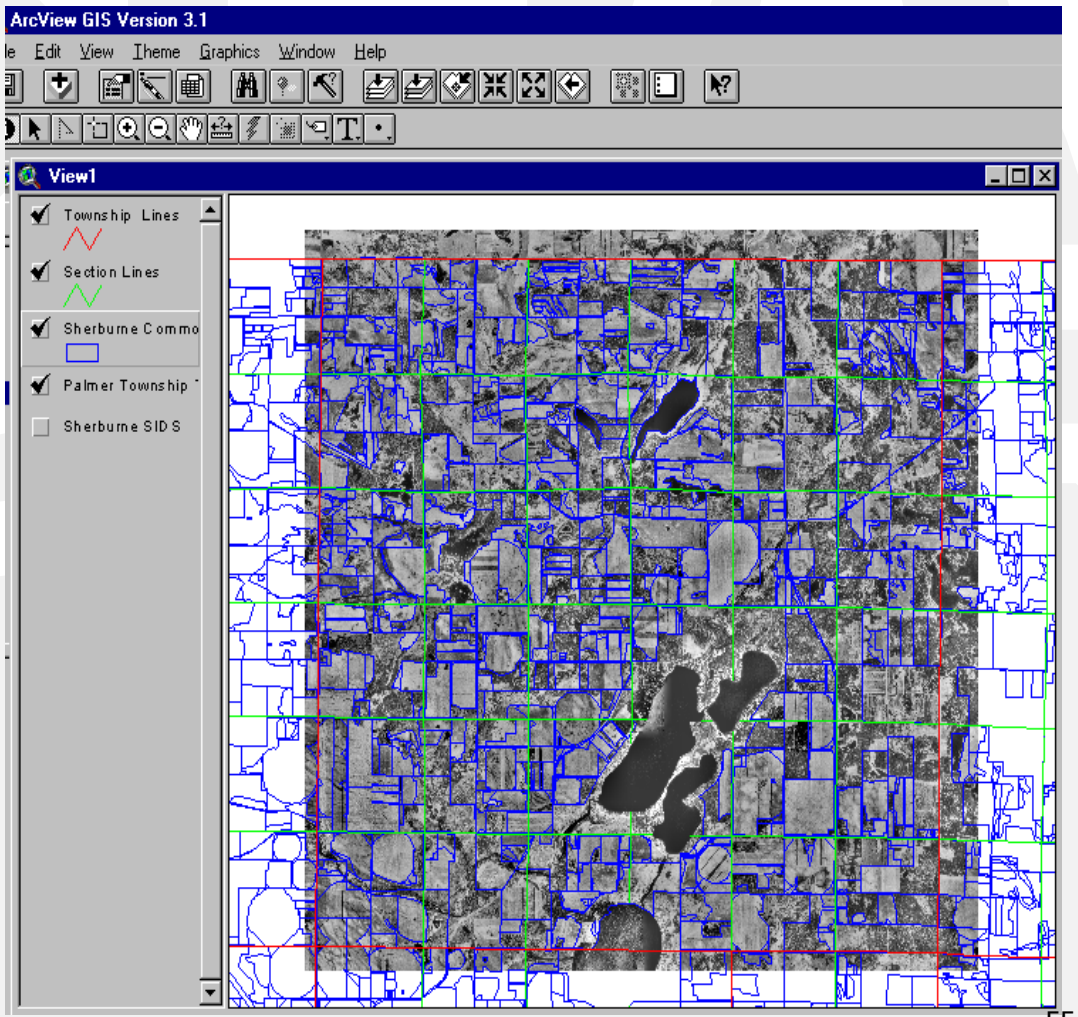
A Shapefile is made up of points, lines, and polygons. You must have at least three specific files to open it in ArcView. They are the .SHP, .DBF, .SHX files, and they all must be named exactly the same.



ArcView Training

.TIFF Files

.TIFF stands for Tag Image File Format, your imagery files. These are uncompressed and usually very large files. You will use these files when maintaining or updating your county's Common Land Units (CLU's). The two files needed to open a .TIFF file are .TIFF and .TFW. Both have to be named exactly the same.

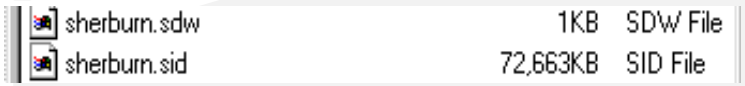


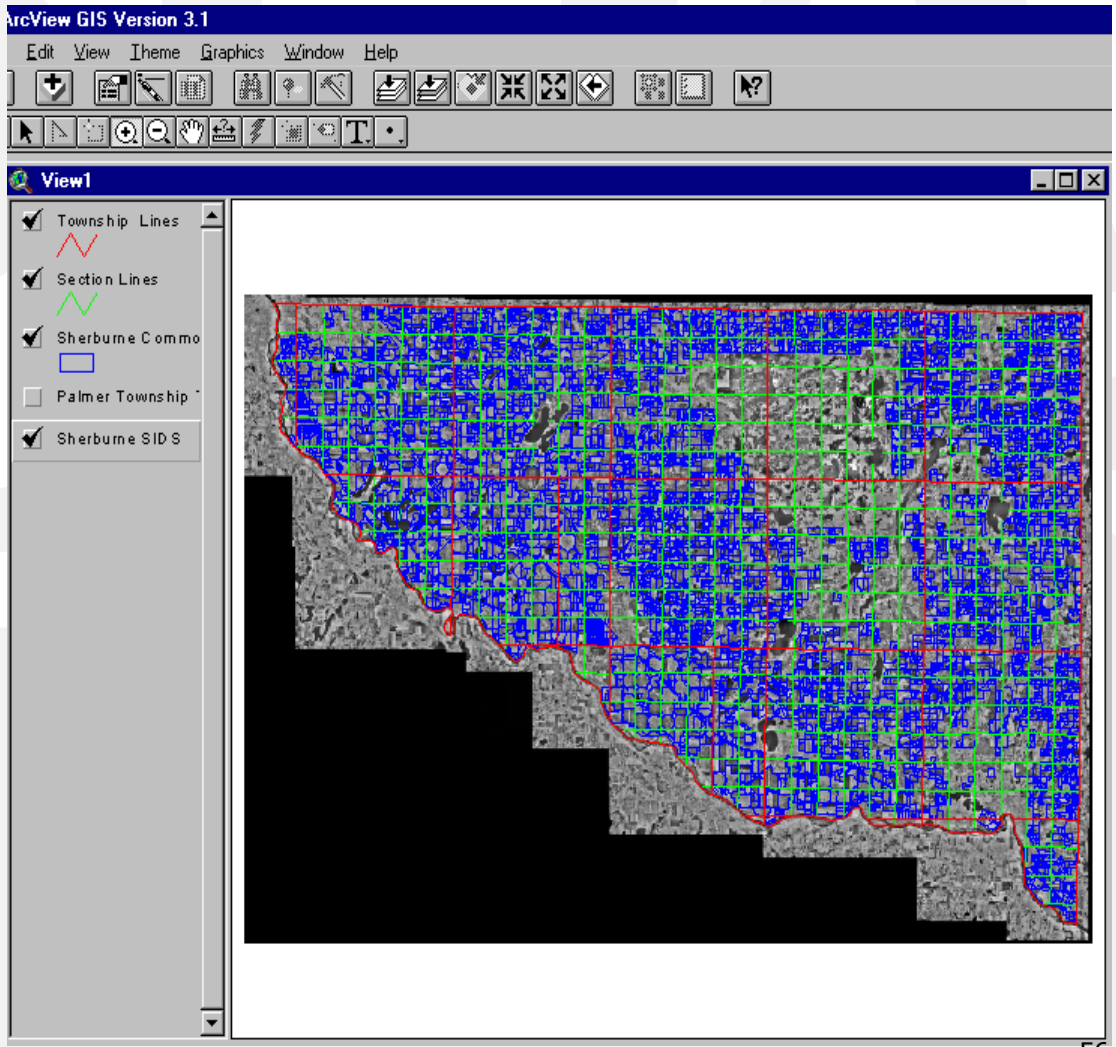
T33nr27w.tfw	1KB	TFW File
T33nr27w.tif	113,733...	TIF Image
T33nr28w.tfw	1KB	TFW File
T33nr28w.tif	111,119...	TIF Image

ArcView Training

MrSID

MrSID is the file format for our imagery files that are compressed. That means we can fit a lot more of the image on one file. The two files needed for a MrSID file are .sid and .sdw. You can use MrSID whenever you are not editing the CLU. Both must have the same name.





ArcView Training

Exercise 4 - The Legend Editor

This exercise will teach you to:

- Create Theme Legends
- Use the Legend Editor
- Classify Data
- Symbolize Legends
- Customize Legend Text

ArcView Training

Theme Legends

- Part of the power of GIS technology is the ability to create map displays based on the attributes of the features themselves

- In ArcView, this is done using the Theme Legend Editor

- Use the Legend Editor to Classify Data and assign symbols to the Theme

ArcView Training

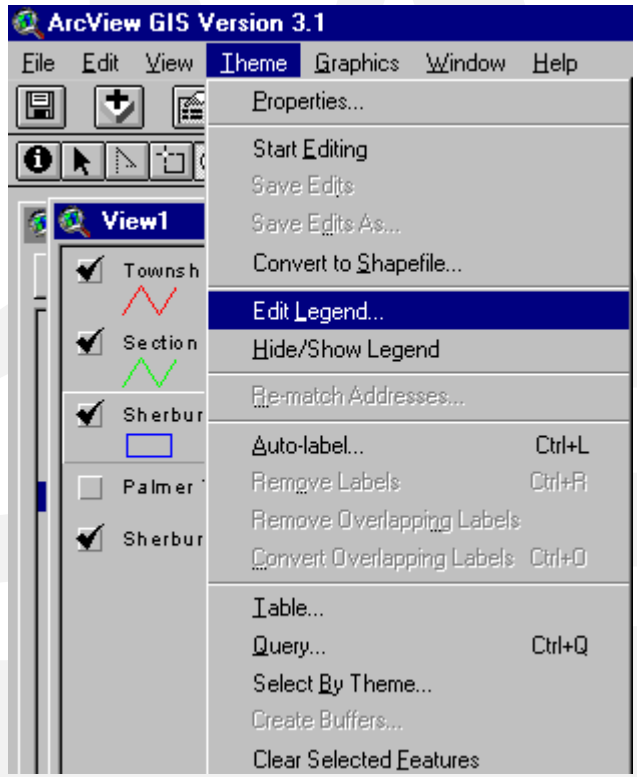
Legend Editor

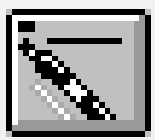
There are three way to access the legend editor:

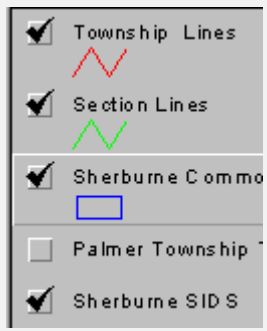
1) Select the THEME pull-down menu and choose the ***Edit Legend*** option.

2) Double click the active theme's legend in the table of contents.

3) Click on the Edit Legend Button in the Button Bar.



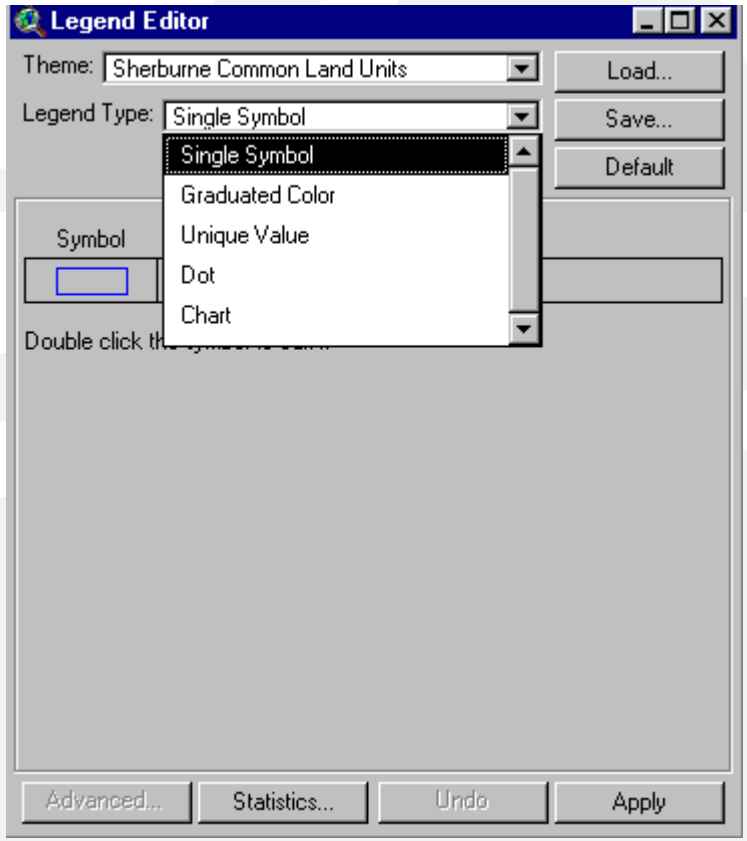




ArcView Training

Theme Classification

To change a Legend, click on the arrow for the Legend Type in the Legend Editor



There are five types of legends to choose from:

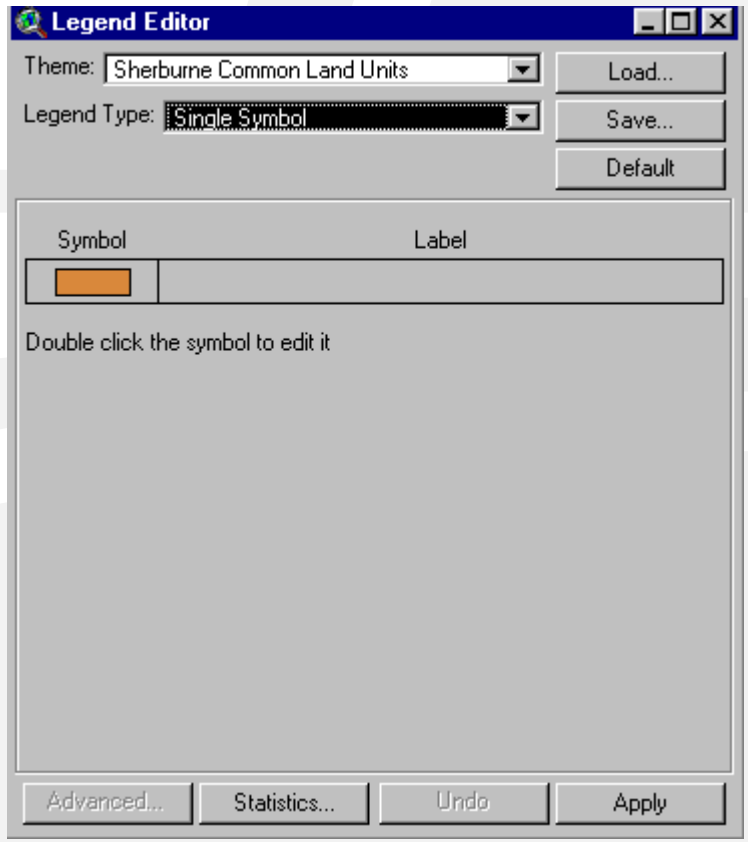
1) Single Symbol - Single color, no classification
2) Graduated Color - Legend based on Classified field Values
3) Unique Values - A legend where each value has a legend class
4) Dot - A Dot density legend
5) Chart - Creates Charts from Attributes

ArcView Training

Theme Classification

Single Symbol Legends

This shows the features in the theme displayed by the same color and/or symbol. Use this when you only need to show where a theme's features are located. You can change the symbol and label in the Legend Editor as needed.

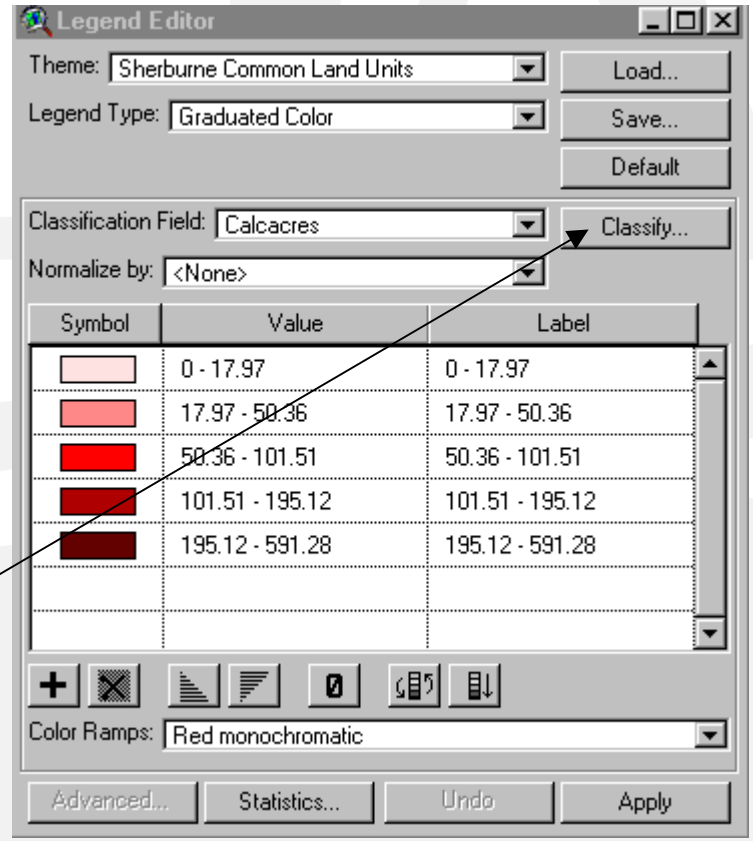


ArcView Training

Theme Classification

Graduated Color Legends

This displays the features of a theme using color. These maps are mainly for numeric data with a progression or range of values. The default Graduated Color Legend is based on the Natural Breaks in that themes data. You can change that by clicking on the CLASSIFY button.



ArcView Training

Theme Classification

Graduated Color Legends

Five methods could be used to classify a themes data.

1) Equal Area - classes will have approximately the same total area in each polygon

2) Equal Interval - classes have an equal class range

3) Natural Breaks - classes are assigned based on the “natural” groupings and patterns present in your data

4) Quantile - classes contain the same number of features

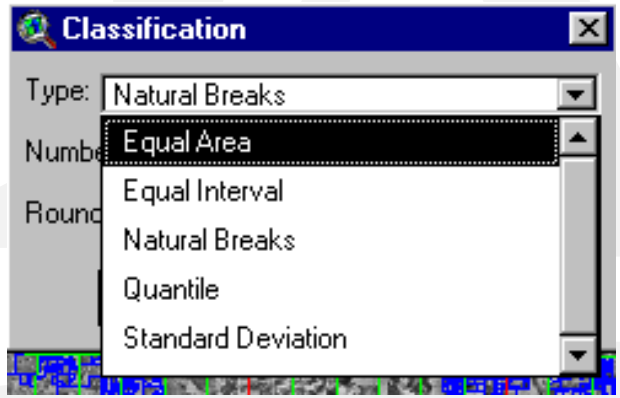
5) Standard Deviation - classes break above and below the mean at intervals of either 1/4, 1/2, or 1 standard deviations

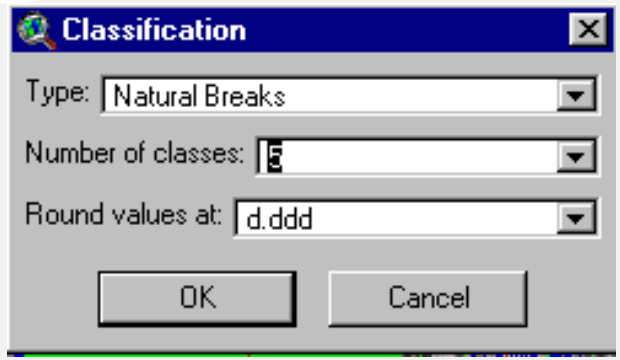
ArcView Training

Theme Classification

Graduated Color Legends

Once a classification has been decided upon, you can modify the number of classes and the number of decimal points to be used in the legend, based on the data found in the Values Field.





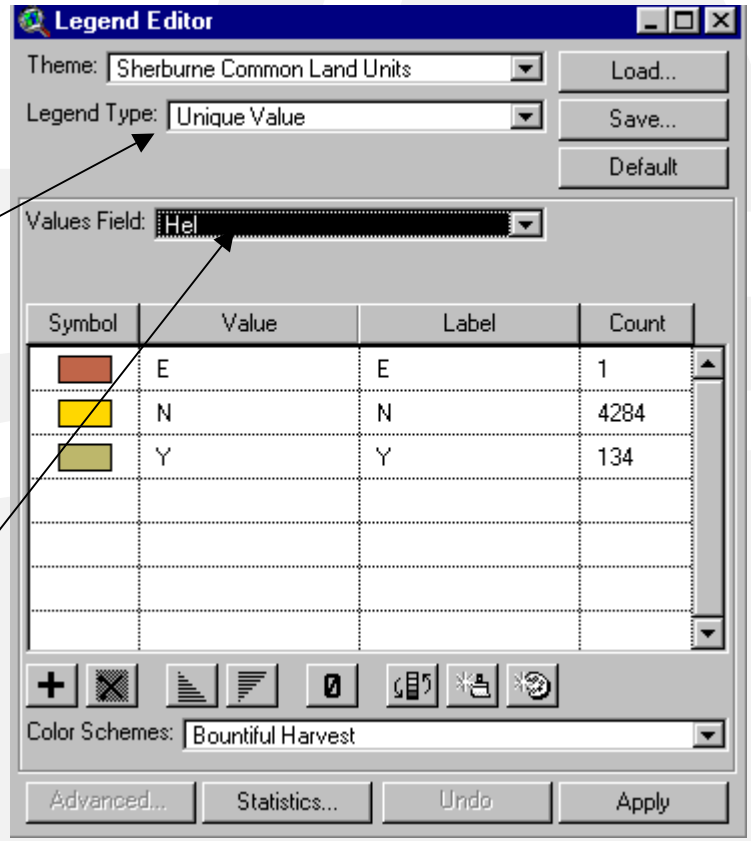
ArcView Training

Theme Classification

Unique Value Legends

Each value in a theme is represented with a unique symbol. It is most effective for displaying categorical data.

Once Unique Value is selected as the Legend Type, choose the field to be displayed. You will be able to choose from all the fields in that themes attribute table.

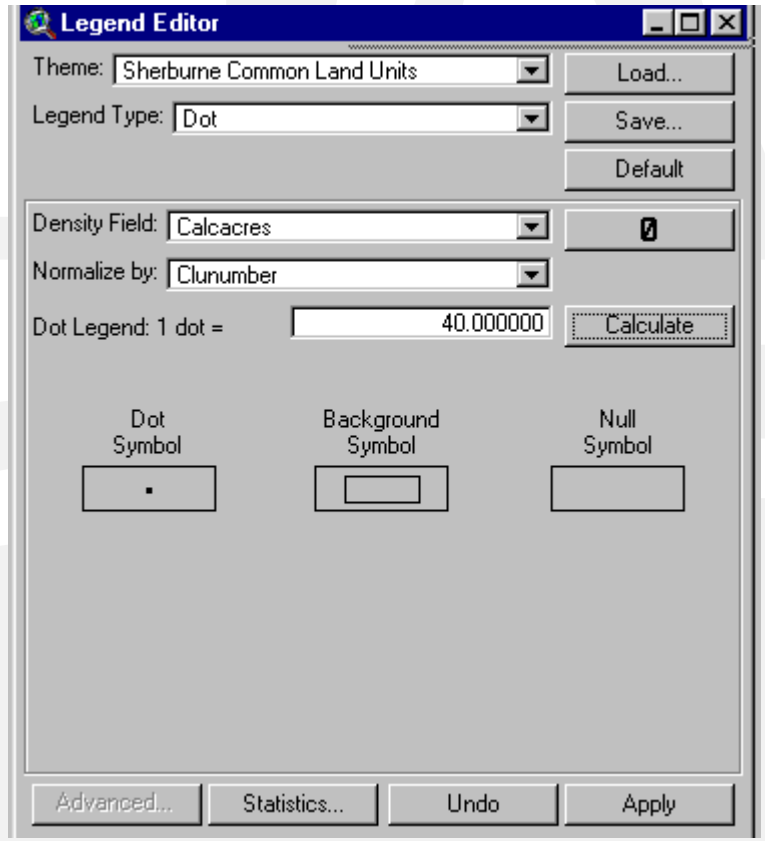


ArcView Training

Theme Classification

Dot Legends

This shows features of a polygon theme displayed by a number of dots corresponding to a value. This is good for showing distribution.

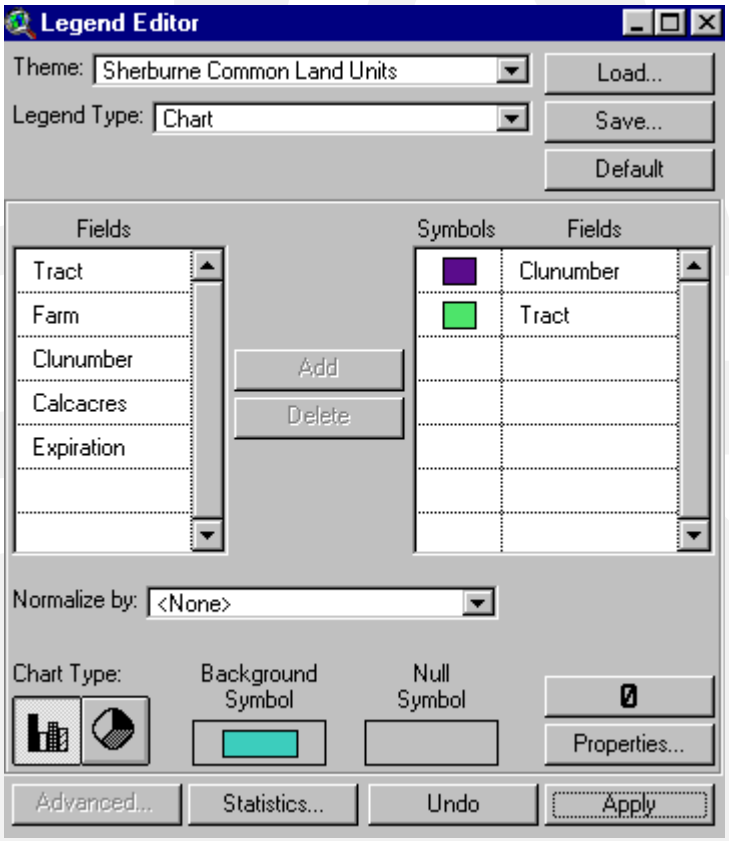


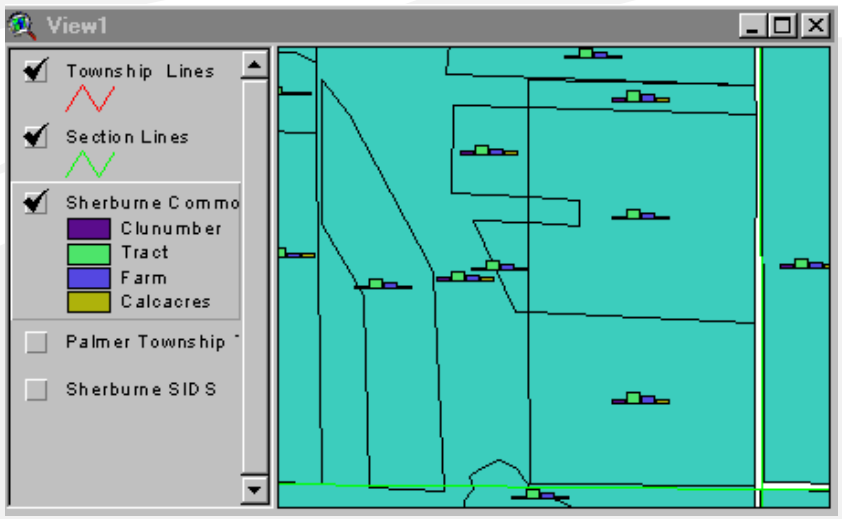
ArcView Training

Theme Classifications

Chart Legends

These show features displayed by a chart. The components of the chart correspond to data attributes you specify, and the size of each part in a chart is determined by the value of each data attribute. This is good for displaying values of multiple attributes.





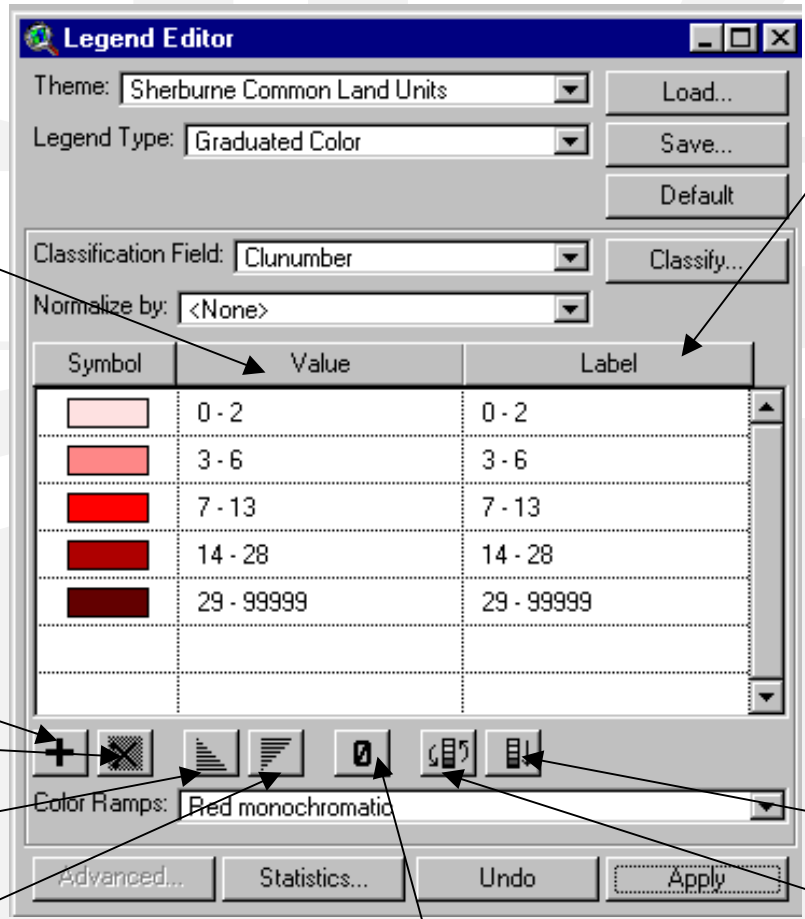
ArcView Training

Theme Classification

Legend Editor Capabilities

Values are the field values in the Attribute Table

Labels are displayed in the Theme's Legend



Add Legend Class

Remove Legend Class

Sort Legend Descending

Sort Legend Ascending

Assign as Null

Ramp Colors

Flip Symbols

ArcView Training

Legends

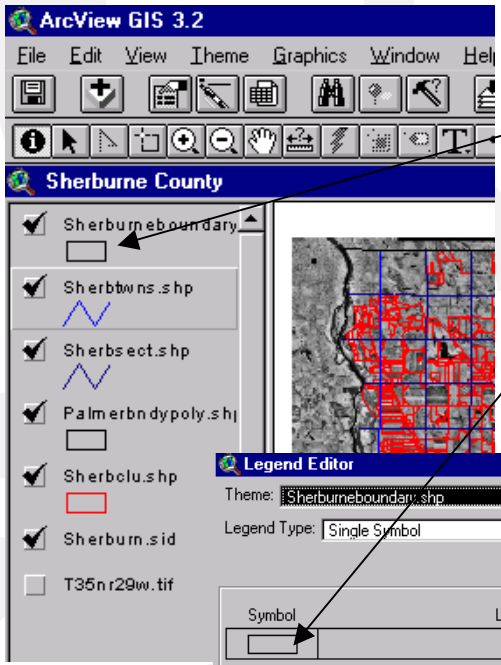
The Legend Editor can change the symbol used to identify the legend classes. You can change:

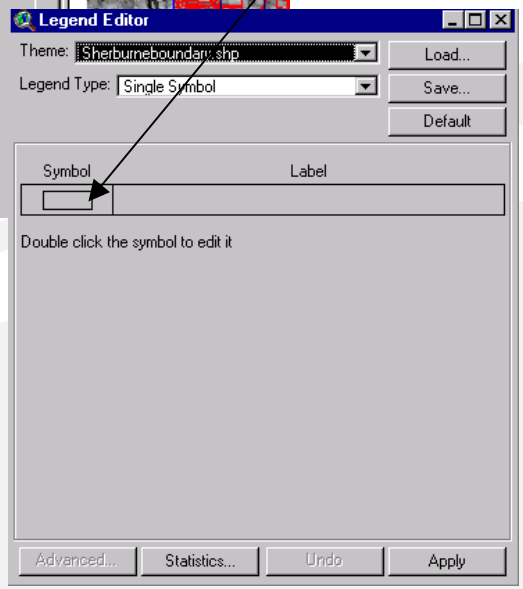
- Polygons
  - Fill and Color
  - Outline Width and Color
- Lines
  - Line Color, Width, and Style
- Points
  - Point Marker Symbol, Size, and Color
- Text
  - Font, Style, Size, and Color

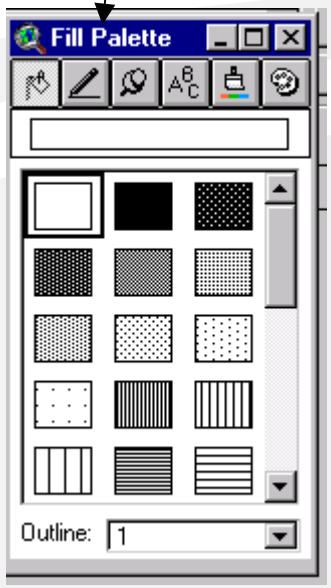
ArcView Training

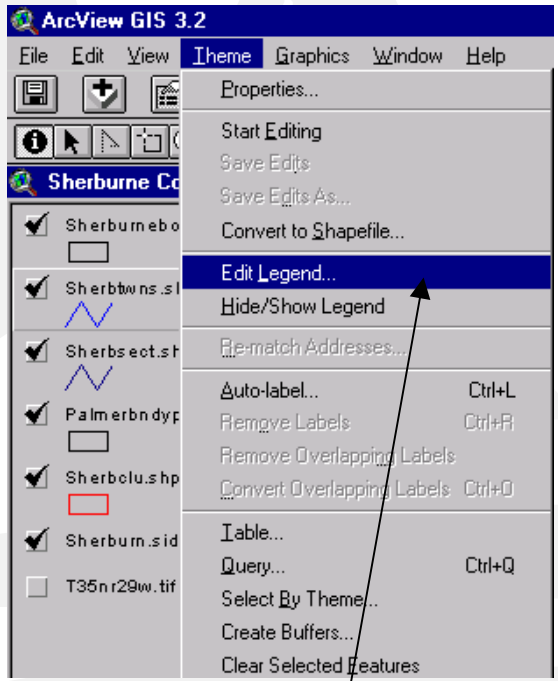
Legends

To change a symbol, double click on the symbol in the Table of Contents in the View and then again on the Symbol in the Legend Editor. This will bring up various Palettes.







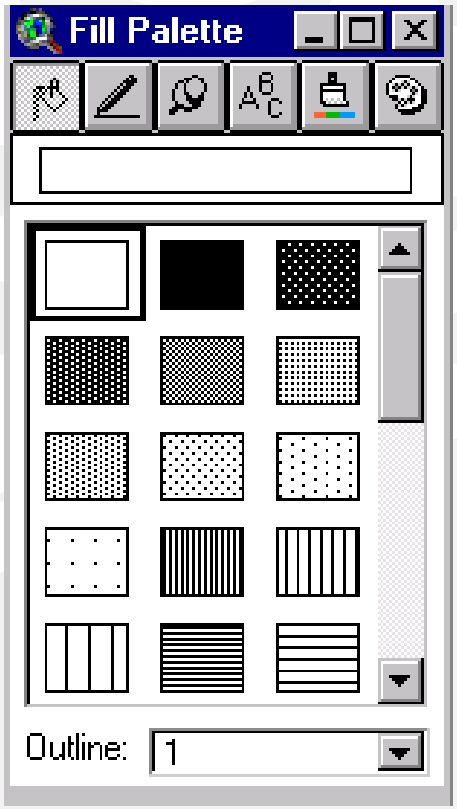


The *Legend Editor* can also be found under the Theme menu pull-down in the View.

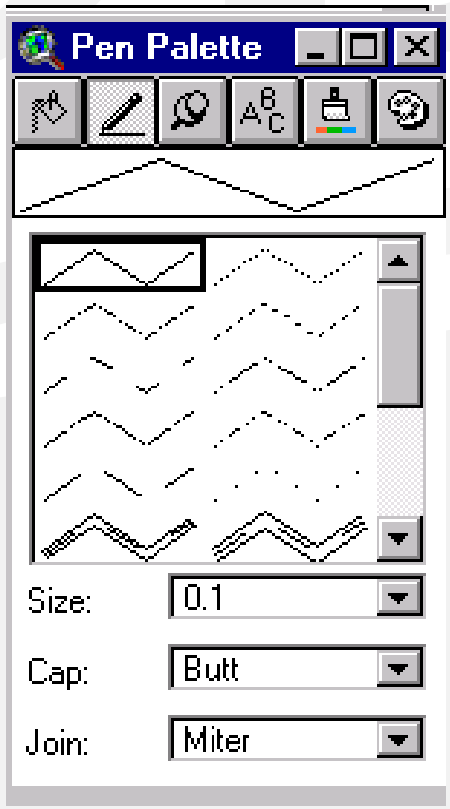
ArcView Training

Palettes

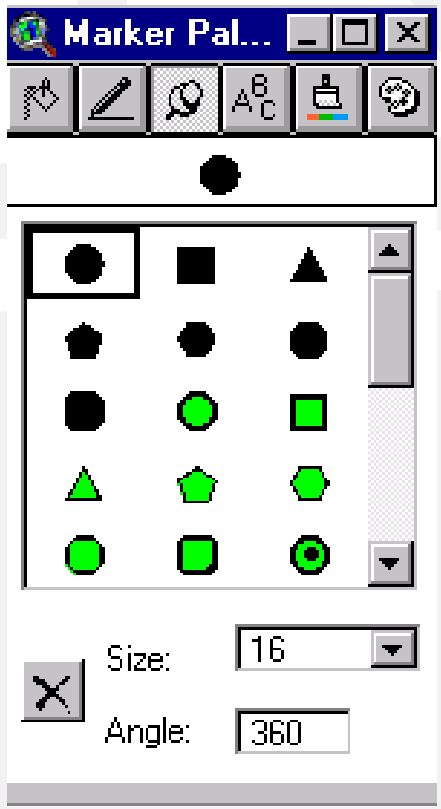
Changes the Fill Patterns and Outline Widths



Changes Line Symbols and Widths



Changes Sizes and Styles of Points



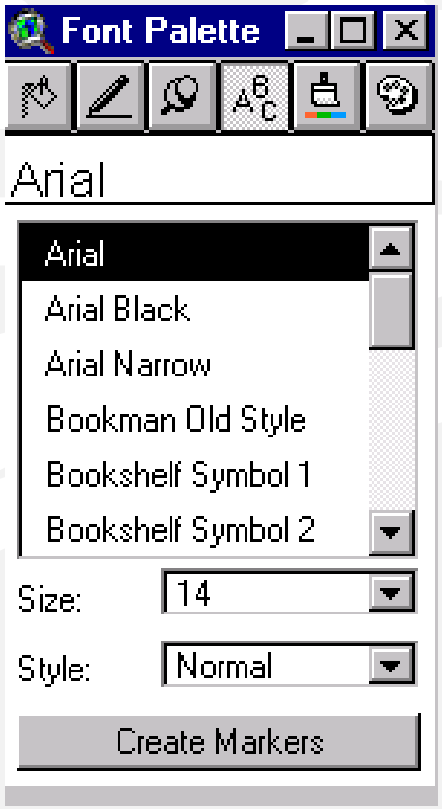
ArcView Training

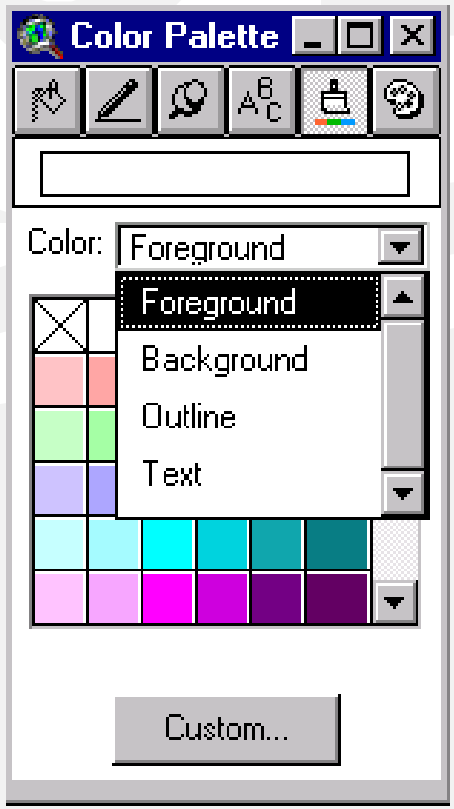
Palettes

Changes Text Style, Size, and Font

Changes the Color of the Outline, Text, Background, or Foreground

Loads, Saves, and Clears any ArcView Palettes. More can be found in the ArcView install directory



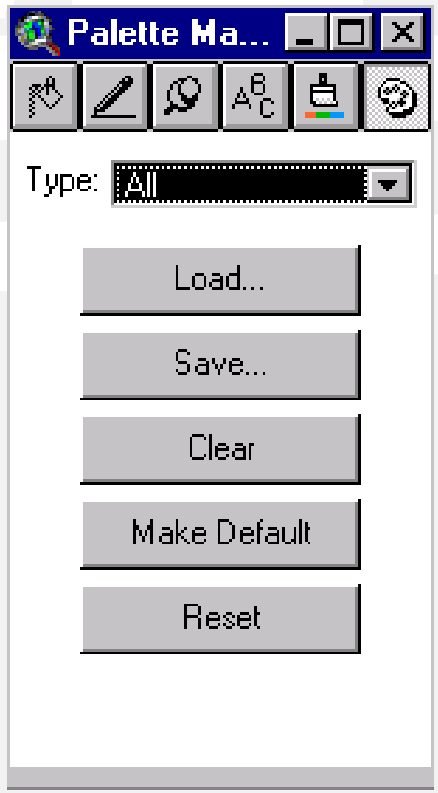


Foreground deals with Lines and Polygons

Background deals with polygons

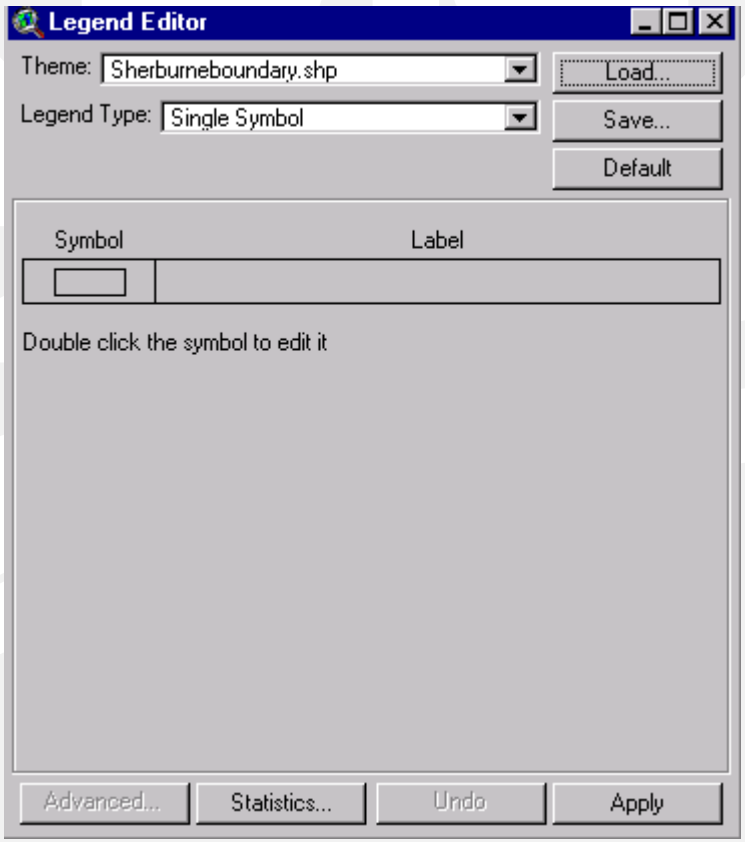
Outline deals with polygon outlines

Text deals with text



ArcView Training

Saving and Retrieving Legends



Legends that you create can be saved and re-loaded into your projects at a later time.

ArcView Training

Exercise 5 - The Table Document

This exercise will teach you to:

- Add Table Documents to your ArcView Project
- Open, Close, and Remove Tables
- Set Table Properties (Aliases and Hiding Fields)
- Change Table Display Characteristics
- Join Tables

ArcView Training

The Table Document

This is used by ArcView to manage and display Tabular Information

DBASE, INFO, and Delimited data files all qualify as table data sources

Tables that are created from Spatial Data are called Feature Attribute Tables

Many data tables can be managed within a single ArcView Project

ArcView Training

The Table Document

Tables are an ordered set of values arranged as Fields (Columns) and Records (Rows)

A Record represents a single observation

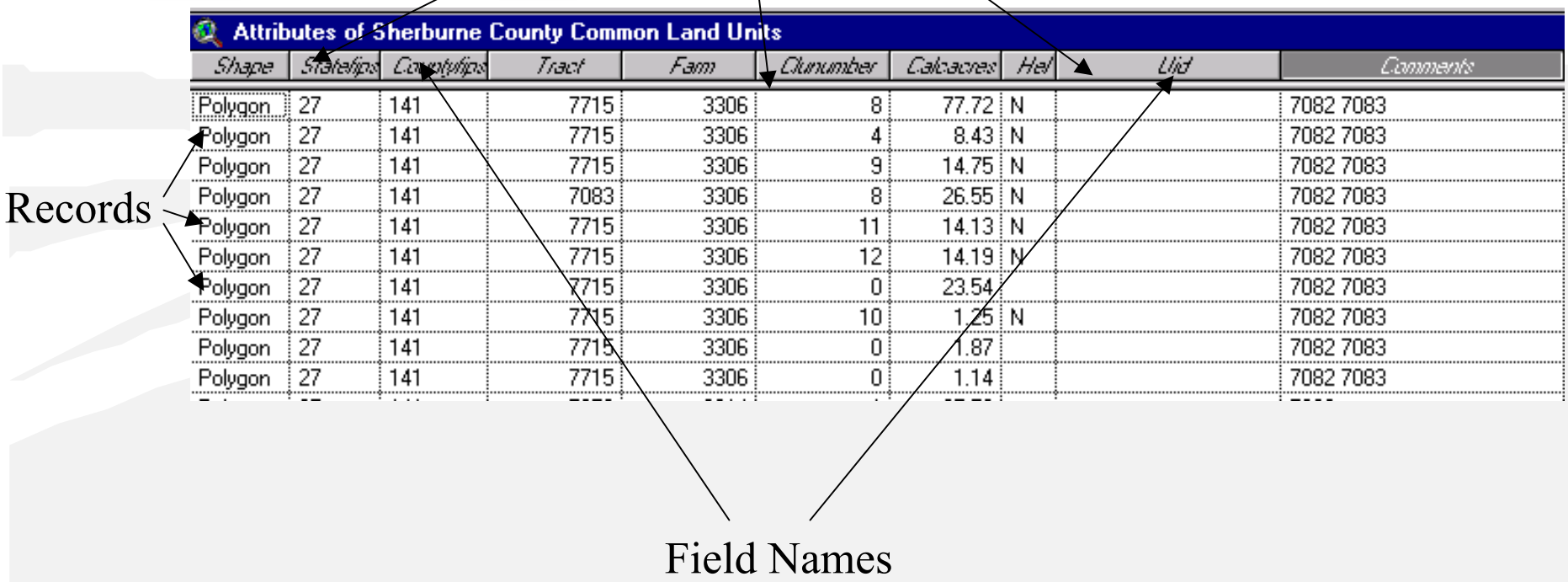
Fields contain the descriptive data about that observation

Four Types of Fields

1) Numeric - Numbers Only
2) String - Alphanumeric Text
3) Date - Dates expressed as yyyymmdd or 20000731
4) Boolean - Either a true or false statement

ArcView Training

The Document Table

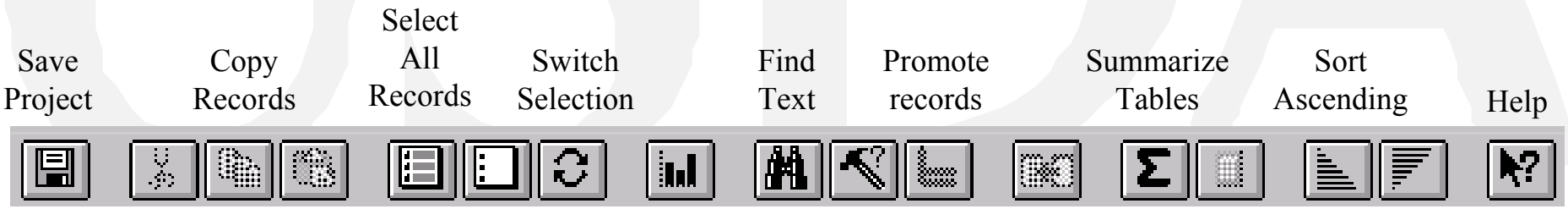


Shape	Statefips	Countyfips	Tract	Farm	Clunumber	Calcacres	Hel	Uid	Comments
Polygon	27	141	7715	3306	8	77.72	N		7082 7083
Polygon	27	141	7715	3306	4	8.43	N		7082 7083
Polygon	27	141	7715	3306	9	14.75	N		7082 7083
Polygon	27	141	7083	3306	8	26.55	N		7082 7083
Polygon	27	141	7715	3306	11	14.13	N		7082 7083
Polygon	27	141	7715	3306	12	14.19	N		7082 7083
Polygon	27	141	7715	3306	0	23.54			7082 7083
Polygon	27	141	7715	3306	10	1.25	N		7082 7083
Polygon	27	141	7715	3306	0	1.87			7082 7083
Polygon	27	141	7715	3306	0	1.14			7082 7083

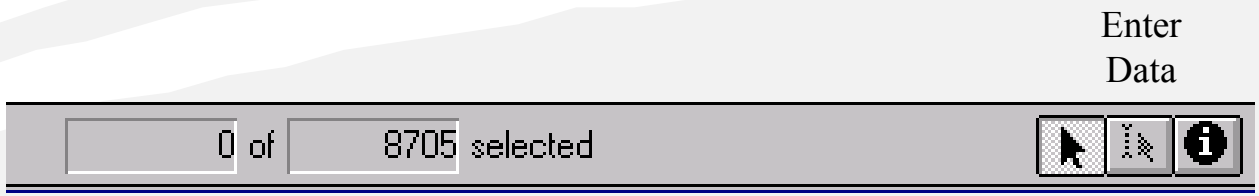
ArcView Training

The Table Document Interface

The Button Bar



The Tool Bar - These tools only work when the cursor is on the Table Document



ArcView Training

Tables or Theme Attribute Tables

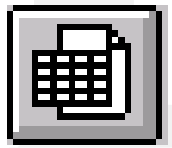
There are two types of ArcView Tables

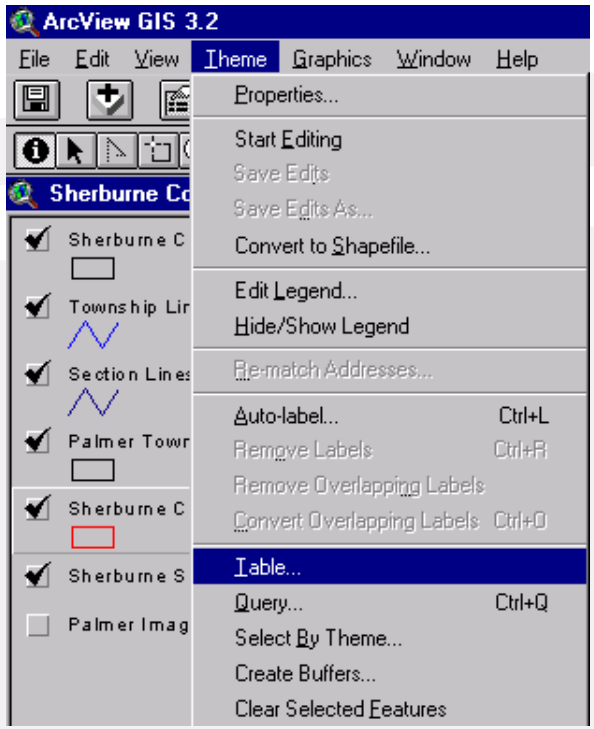
1) Theme Attribute Tables
   - These are accessed from the View Document Interface
   - They are dynamically linked to a Theme Display
   - A selection in the Table will result in that associated feature being selected in the View
   - Every Attribute Table has a field called *shape* that defines the feature class

2) Data Tables
   - These are added from the Project Window
   - They are not dynamically linked to the Theme
   - They have to be linked or joined to a Theme Attribute Table to be useful

ArcView Training

Accessing a Theme Attribute Table

Have the Theme of choice active in the View Document and click the Open Theme Table Button  or select the THEME pull-down menu and choose the ***Table*** option

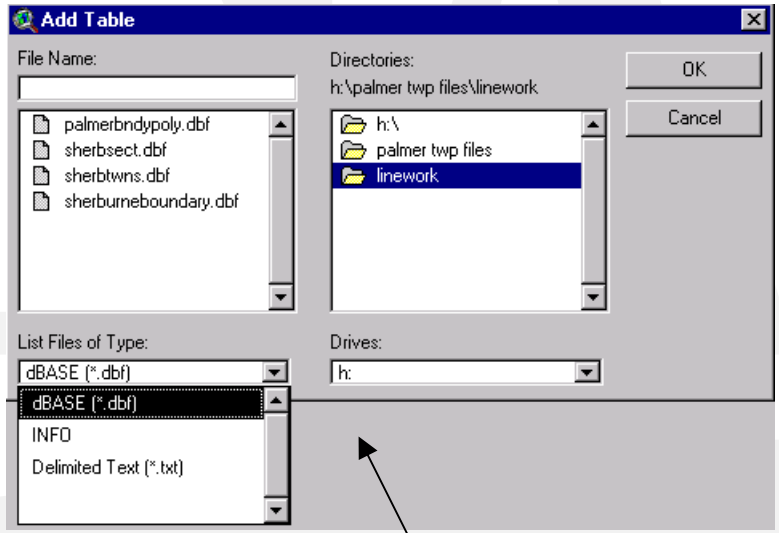


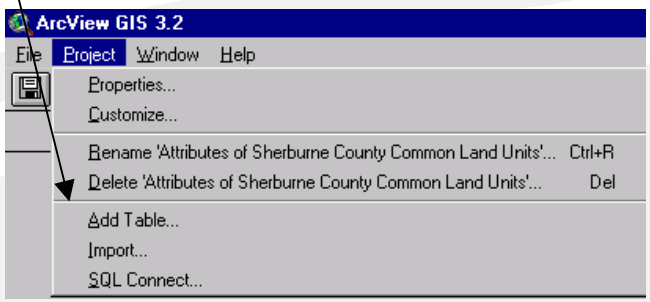
ArcView Training

Data Tables

Adding a Data Table

Make the Table Folder active in the Project Window and click the Add button or select ***Add Table*** in the PROJECT pull-down menu.





Maneuver to the location of the file and select the Type (usually .dbf)

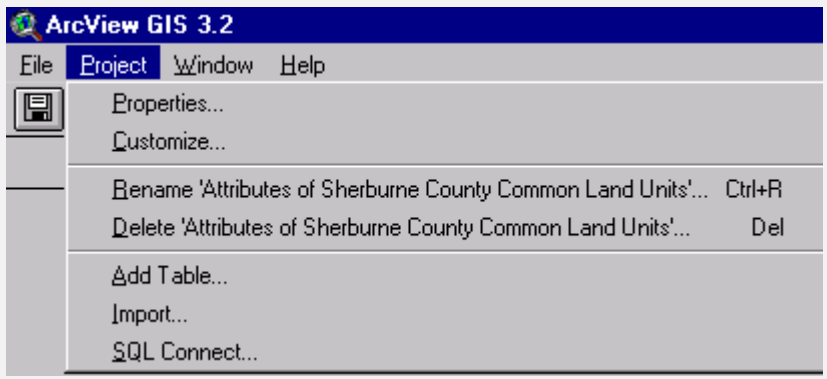
ArcView Training

Adding Tables

Make the Table Folder active in the Project Window

Highlight the table that will be opened and press the Open Button or just double-click on the name of the table

To Delete the table from the project, highlight the file and press delete on the keyboard or select delete from the PROJECT drop-down menu

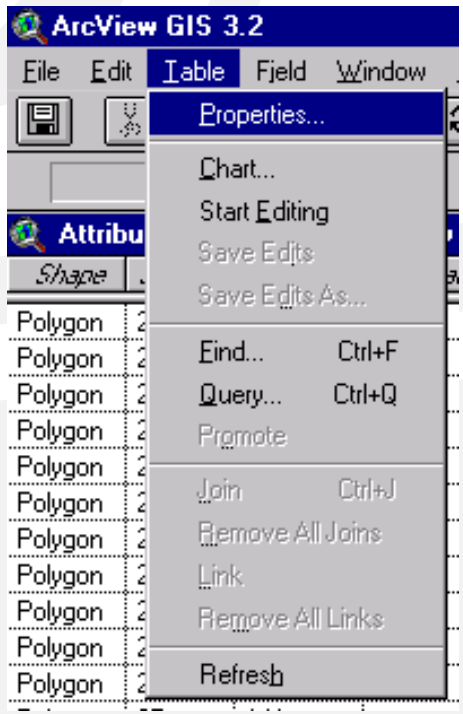


ArcView Training

Table Properties

Every table has a Property Sheet that defines important data information that is specific to that table.

Access the Table Property Sheet by selecting the TABLE menu pull-down and choosing the ***Properties…*** Option



ArcView Training

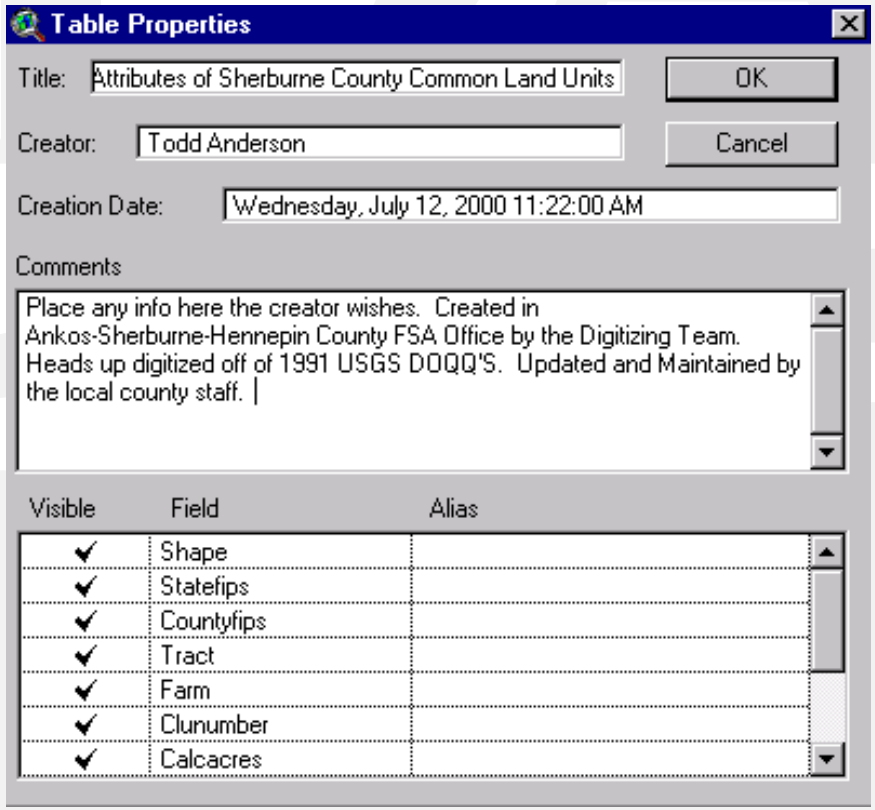
Table Properties

Change the Title, Creator, and Date as needed

Use the Comments section to document your tables

An Alias is an alternate name for a field in a table, usually used if the original Field name is unclear

The Visible column lets you turn the field off or on in the Attribute Table



ArcView Training

Tables

Where do Tables come from?

- They are generated from Database Tables
- ArcView supports the following Database Tables Formats
  - DBASE - These are the default table format in ArcView, all Shapefiles have a DBASE component
  - INFO - These tables are used for ARC/INFO UNIX format coverages
  - Comma or Tab Delimited ASCII Tables - To use these, the first line must contain the Field Names

ArcView Training

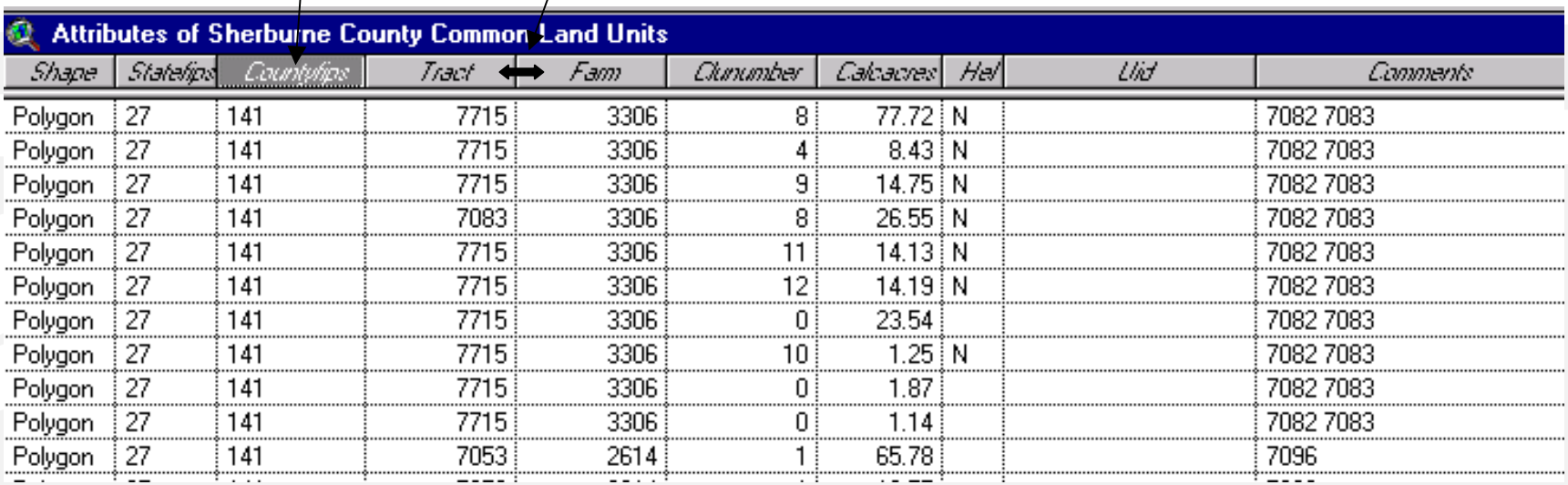
Tables

Navigating Fields

Fields can be made active

Fields can be widened

Order of the Fields can be changed



Attributes of Sherburne County Common Land Units

Shape	Statefips	Countyfips	Tract	Farm	Clunumber	Calcacres	Hel	Uid	Comments
Polygon	27	141	7715	3306	8	77.72	N		7082 7083
Polygon	27	141	7715	3306	4	8.43	N		7082 7083
Polygon	27	141	7715	3306	9	14.75	N		7082 7083
Polygon	27	141	7083	3306	8	26.55	N		7082 7083
Polygon	27	141	7715	3306	11	14.13	N		7082 7083
Polygon	27	141	7715	3306	12	14.19	N		7082 7083
Polygon	27	141	7715	3306	0	23.54			7082 7083
Polygon	27	141	7715	3306	10	1.25	N		7082 7083
Polygon	27	141	7715	3306	0	1.87			7082 7083
Polygon	27	141	7715	3306	0	1.14			7082 7083
Polygon	27	141	7053	2614	1	65.78			7096

ArcView Training

Tables

Tabular Joins are used in ArcView to join two table documents that have a common field

Two Tables are required

1) Destination Table - It is the highlighted table, the one you want to join to

2) Source Table - It is the table that contains additional information you wish to join

The Source Table is joined to the Destination Table

ArcView Training

Tables

A Join is used to establish a one-to-one or a many-to-one relationship between the two tables

A one-to-one relationship means each record in the destination table is related to one record in the source table

If the Destination Table is a Theme Attribute Table, the joined information can be used to create thematic maps

ArcView Training

Tables

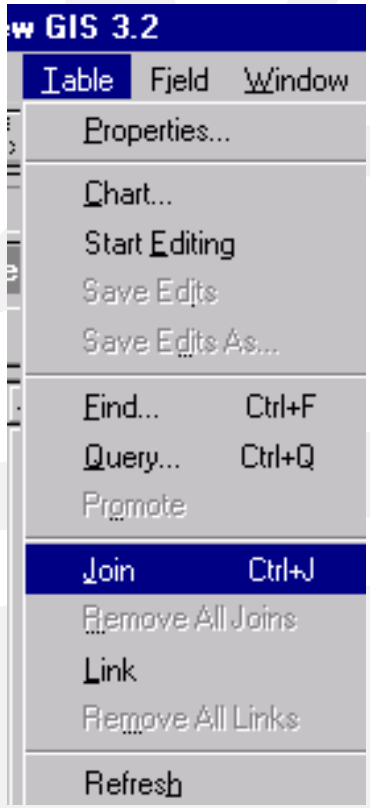
Joining Tables Process:

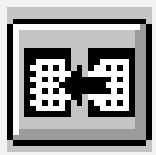
Open the two tables of interest

Make the Source Table active and click on the common field to make it active

Make the Destination Table Active and click on the common field to make it active

Join the tables using the TABLE menu pull-down and selecting the ***Join*** option or click on the Join Button





ArcView Training

Tables

Destination Table
Table and Common Field Active

Attributes of Sherburne County Common Land Units

Shape	Statefips	Countyfips	Tract	Farm	Clunumber	Calcacres	Hel	Uid	Comments
Polygon	27	141	1681	1170	2	3.09	N		
Polygon	27	141	1681	1170	1	4.38	N		
Polygon	27	141	1682	2533	0	1.43			
Polygon	27	141	1682	2533	0	1.97			
Polygon	27	141	1682	2533	1	77.09	N		
Polygon	27	141	6790	2318	0	34.79			
Polygon	27	141	6791	2793	2	2.22	N		
Polygon	27	141	6791	2793	0	18.29			
Polygon	27	141	6791	2793	1	0.73	N		
Polygon	27	141	6792	2794	1	10.02	N		
Polygon	27	141	6672	2195	2	1.84	N		
Polygon	27	141	6672	2195	0	65.43			
Polygon	27	141	6672	2195	1	8.22	N		

Source Table
Table not Active, Common Field Active

sherbclu.dbf

Statefips	Countyfips	Tract	Farm	Clunumber	Calcacres	Hel	Uid	Comments
27	141	1687	1188	1	8.50			
27	141	1687	1188	2	9.13			
27	141	1685	1309	4	6.87	N		
27	141	1685	1309	2	12.80	N		
27	141	1685	1309	3	4.80	N		
27	141	1685	1309	1	11.22	N		
27	141	7153	2756	0	12.44			
27	141	7153	2756	1	12.45	N		
27	141	1689	1333	11	4.32	N		
27	141	1689	1333	14	9.96	N		
27	141	1689	1333	10	29.18	N		
27	141	1689	1333	15	7.22	N		
27	141	1689	1333	16	17.42	N		

ArcView Training

Tables

A Join is not permanent, they are only joined in your project and not on the hard disk

It can be made permanent by selecting the THEME menu pull-down and choosing ***Convert To Shapefile*** option, or selecting the FILE menu pull-down and selecting the ***Export*** option.

Joins are always re-established at project startup.

Making them permanent can speed up the opening process of your ArcView project files

A link between tables can also be made, creating a one-to-many relationship

ArcView Training

Exercise 6 - Adding Data to Tables

This exercise will teach you:

- How to Modify Data in a Table
- Add/Drop Fields or Records in a Table
- Use the Field Calculator to generate new Field Values
- Generate a Summary Table
- Generate basic Statistics
- Generate a Chart from the Summary Table

ArcView Training

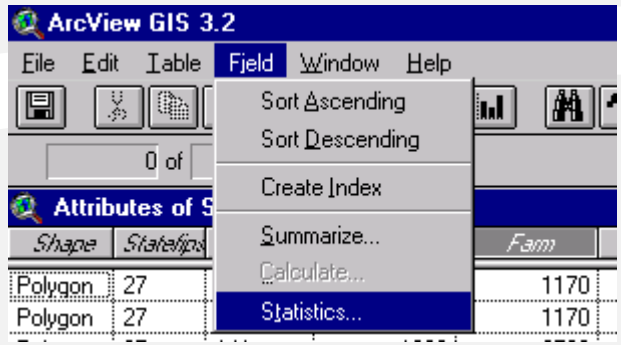
Manipulating Tables

Tables can be manipulated and analyzed using ArcView, creating summaries or generating various statistical results

The Statistics can be quickly generated for the active filed in the Table by using the FIELD menu pull-down and choosing the *Statistics* option

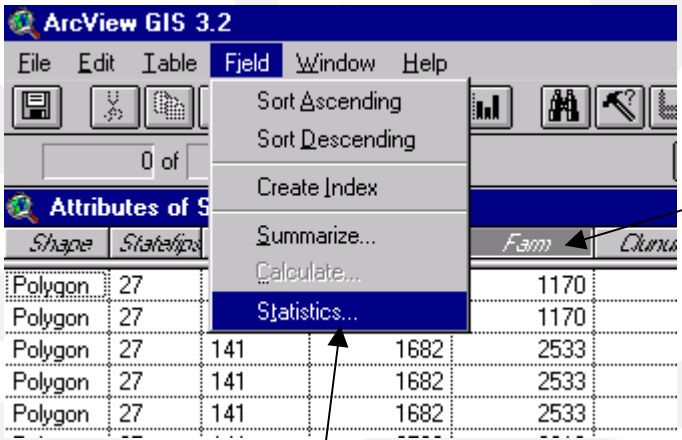
Statistics can only be generated from Numeric Fields

Statistics available are Sum, Count of Records, Mean, Min, Max, Range, Variance, Standard Deviation



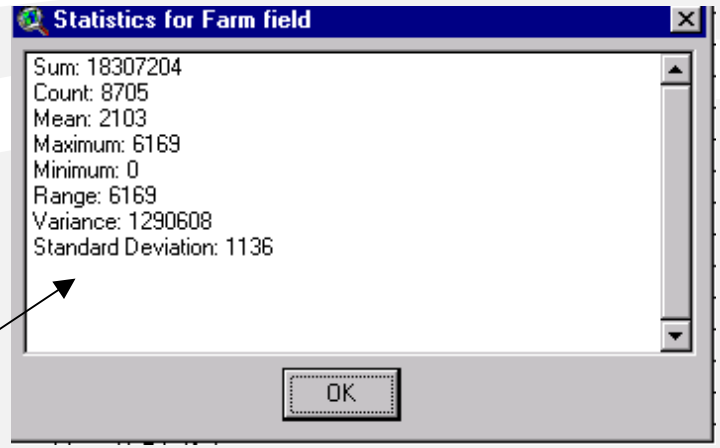
ArcView Training

Field Statistics



Active Field

Statistics option



Generated Statistics

ArcView Training

Field Summaries

ArcView Software can also generate Data Summaries

The function will Summarize the Unique Values of a selected field and then generate Statistics about other selected fields

Field Summaries will create new DBASE Tables

Fields in the new table represent each of the selected statistical operations

Use the Summary Tables to create Charts

ArcView Training

Field Summaries

The Summary Tool can also calculate the following statistics for numeric fields:

Sum of Records	Range
Count of Records	Variance
Mean	Standard Deviation
Minimum	Maximum

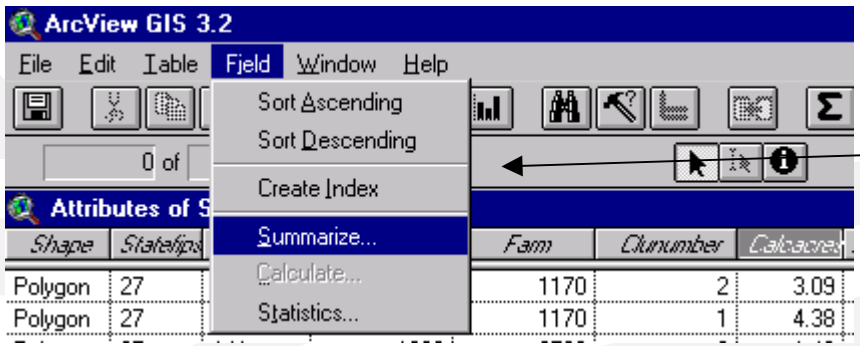
Summaries cannot perform cross-tabulations

Has minimal String and Date summary functionality

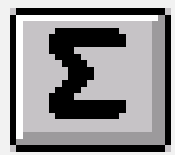
ArcView Training

Summary Tables

Creating the Table



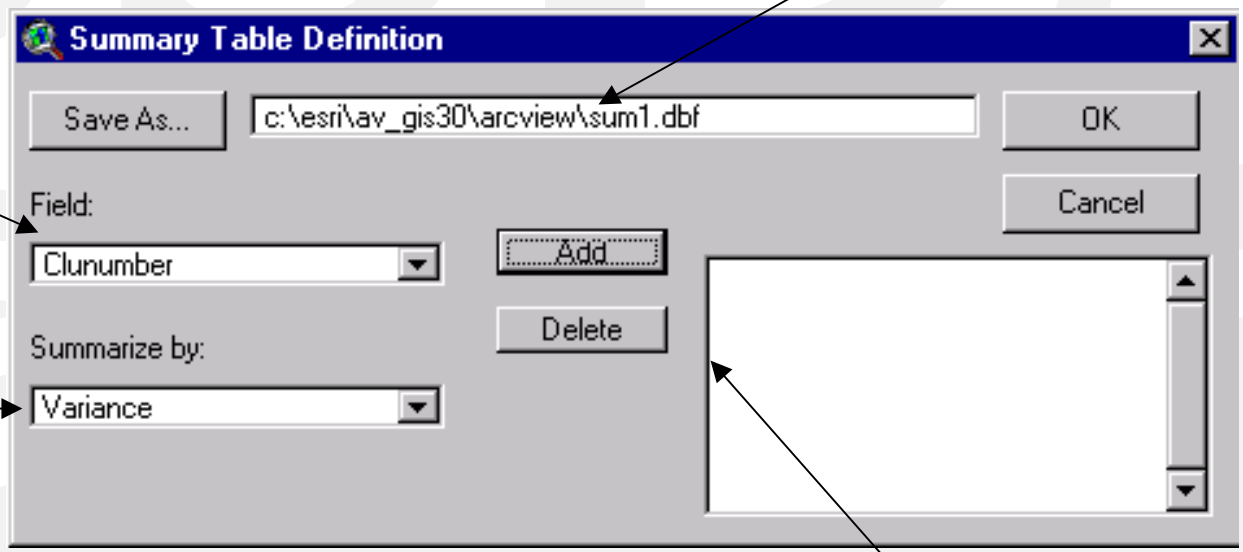
Start the summary process by pressing either the FIELD menu pull-down and choosing the *Summarize* option or click on the Summarize Button



ArcView Training

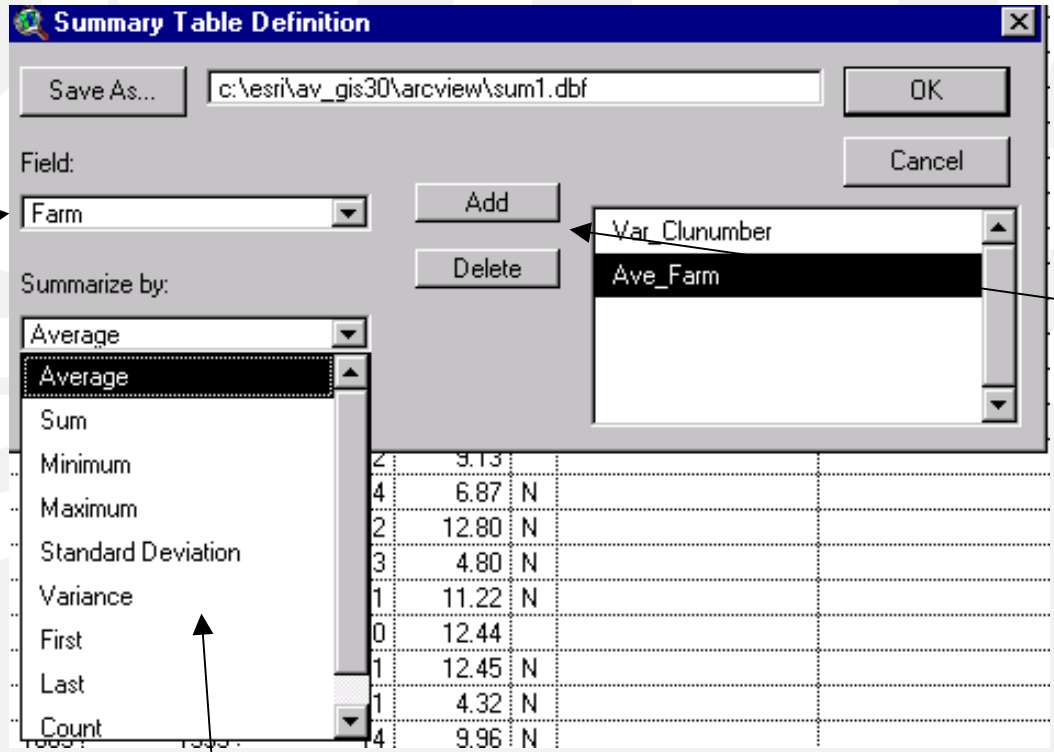
Summary Table

Summarize Dialog Box



ArcView Training

Summary Table



Select the Field to Summarize

Add the Summary to the new Table Field List

Select the Summary Statistic

ArcView Training

Tables

Modifying/Editing

- Modifying data in Tables is allowed
- The changes become permanent, changing the raw data table
- Allowed to Add or Remove both Fields and Records and change Field Values
- Data can be entered by hand or by using the Field Calculator
- Changes in the Table are reflected in any Map or Chart created from the Table

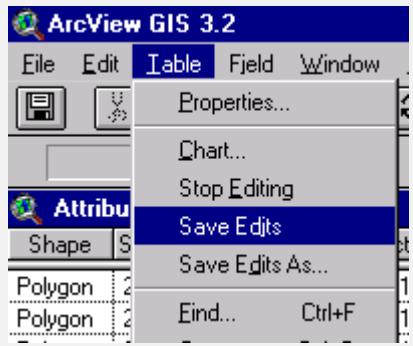
ArcView Training

Tables

Editing

To Edit Tables, you must turn the editing mode on by selecting the TABLE menu pull-down and selecting the ***Start Editing*** option

To stop an editing session, you go back to the same menu and choose the ***Stop Editing*** or ***Save Edits*** option

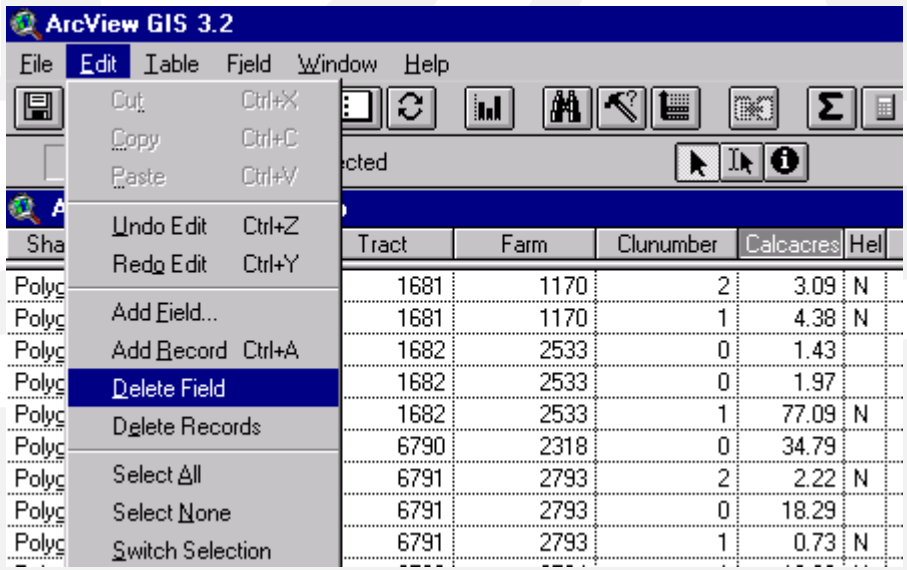


ArcView Training

Tables

Adding/Deleting Fields and Records

Once you Start Editing a table, you can also add new fields by using the EDIT Menu pull-down and selecting the ***Add Field*** option



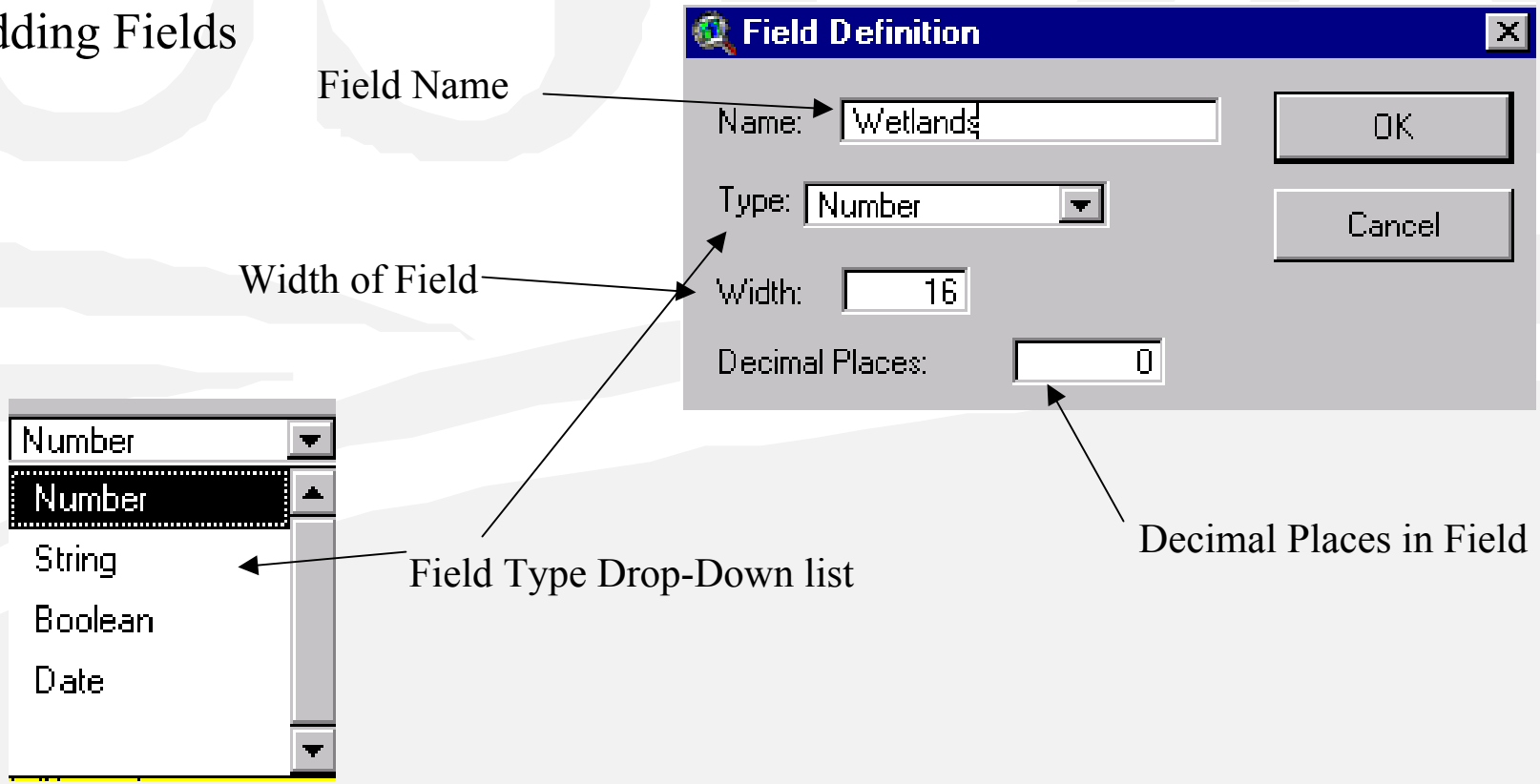
Use the same pull-down menu to ***Delete a Field***, but it must be selected in the table

Use the same procedures to add to delete Records

ArcView Training

Tables

Adding Fields



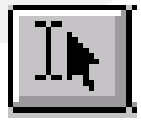
ArcView Training

Data

Adding Data

Data can be added in two ways:

1) To add it by hand:

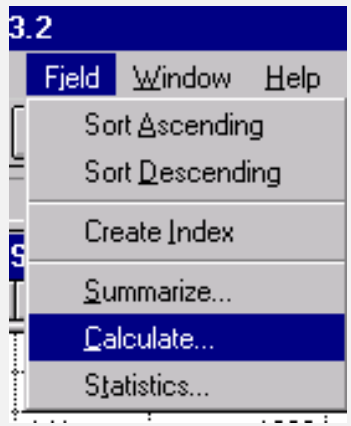
Use the Edit Tool in the Table Interface 

Select the Field to add data to

2) Field Calculator:

Click on the Calculate Button in the Table 

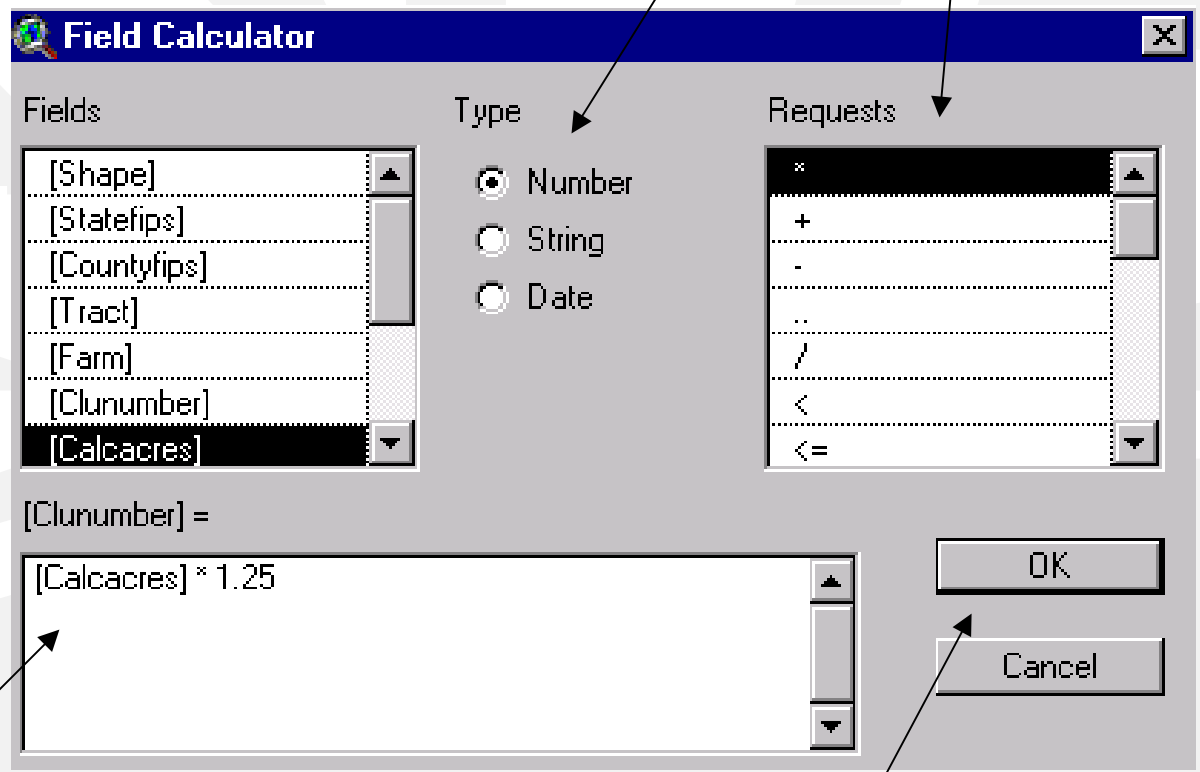
Also accessed through the FIELD menu pull-down and selecting the ***Calculate*** option



ArcView Training

Field Calculator

Type of Calculation and the operations that go with each



Clunumber is the Active Field in the Table

Equation to have Calcacres multiply by 1.25 to equal the Clunumber

OK will start the calculation

ArcView Training

Exercise 7 - Attribute Queries

This exercise will teach you:

- How to perform Attribute Queries on Tables and Themes

- How to use the Query Builder

- How to Save Queries

ArcView Training

Themes and Tables

Queries

Allow the user to ask questions of the data

There are two types of Queries in ArcView

1) Attribute - This works by comparing values in a table with the conditions of a specific query

2) Spatial - This works off the spatial distribution and geographic relationship of features (points, lines, and polygons)

ArcView Training

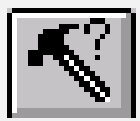
Queries

Attribute Queries

They are conducted on Theme Attribute Tables and Data Tables

Query construction is through ArcView's Query Builder

Access the Query Builder under the TABLE menu pull-down and select the ***Query*** option

You can also use the Query Button 

ArcView Training

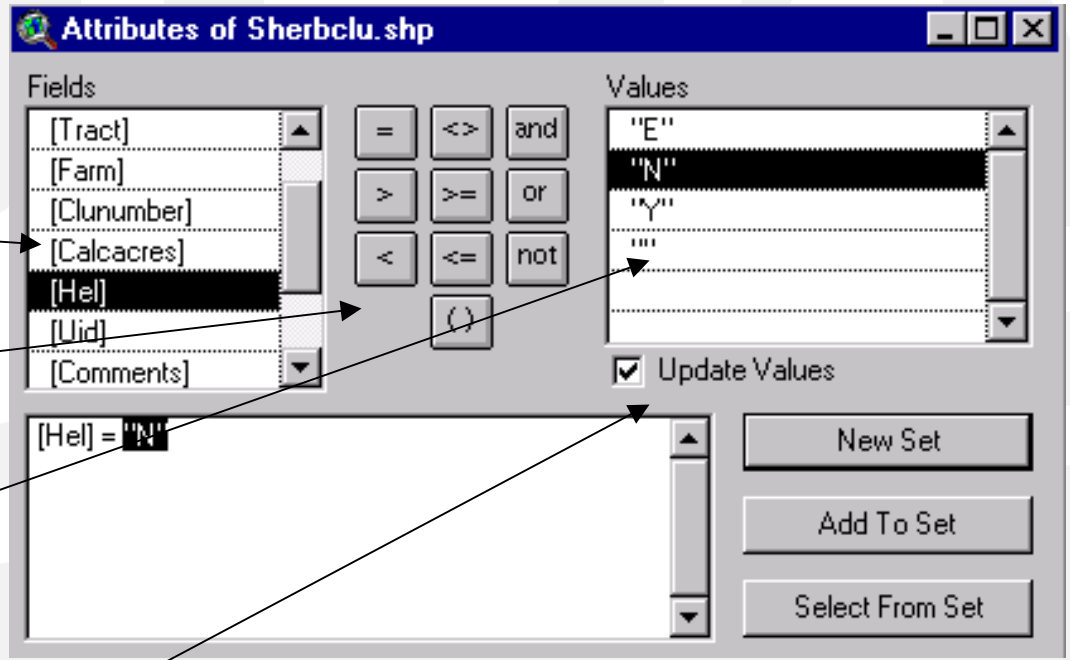
Queries

Directions to perform a Query:

1) Select the Field of interest and double click on it

2) Select the operator of interest with a single click

3) Double click on the value of interest or type in it by hand



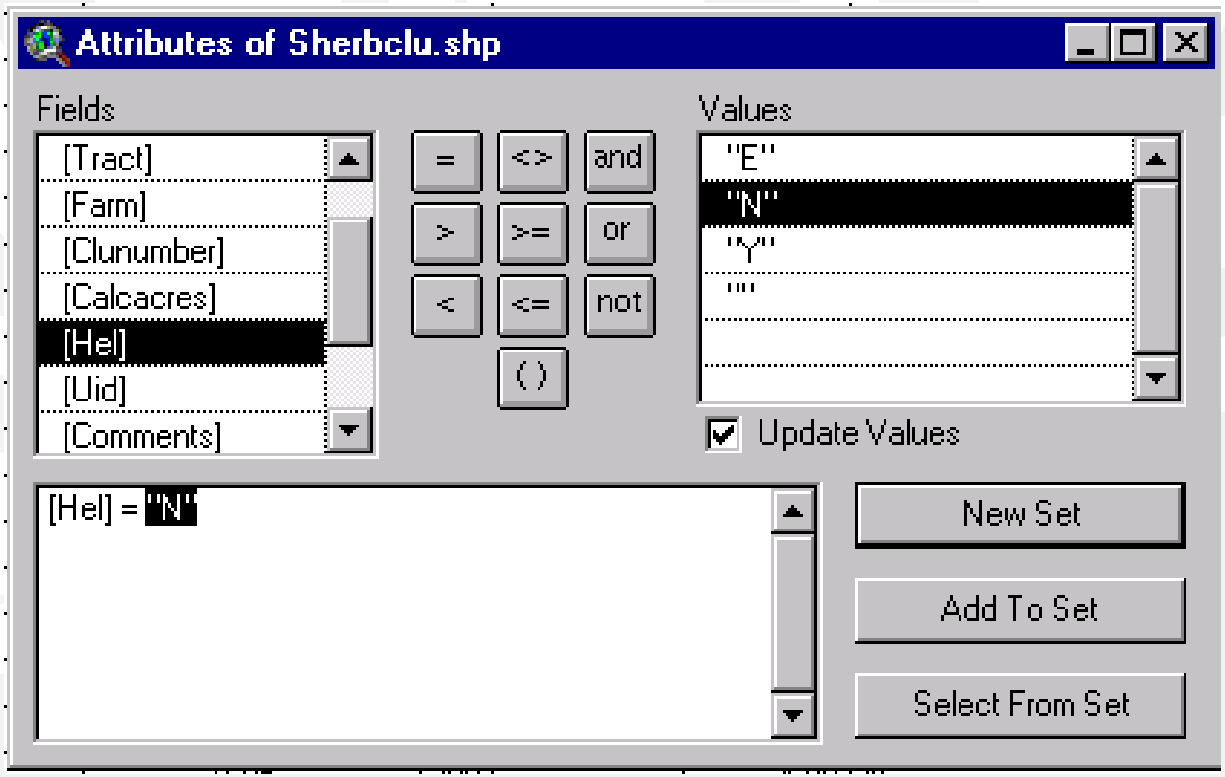
If checked, Update Values displays all different entries in the Attribute Table for that selected Field of interest

- Selection criteria are issued as logical expressions
- Simple to complex queries are possible

ArcView Training

Queries

The Query Builder



New Set creates a new selected set from the Attribute Table

Add to Set adds records to the currently selected set

Select From Set will select records from an already selected set

ArcView Training

Queries

Queries entered by hand

- Must have Field names in brackets [ ]

Query Procedures

- Text has to be enclosed in double-quotes “ ”

- Multiple character wildcard is an asterisk “*”

([comments]=“*Sherburne”)

- Single character wildcard is a Question Mark “?”

([comments]=“?rp”

- All Dates are stored a yyyymmdd

([date]=20000803)

ArcView Training

Queries

Saving Queries

There may be times you would like to save your Queries

Use the Windows Utilities to Copy and Paste the selected Text
- CTRL “c” = Copies the selected to the clipboard
- CTRL “v” = Pastes clipboard contents to desired location

This method is used to save a query or queries that are used often or are very long and tedious to re-write. It also is a good way to document them as part of a project

ArcView Training

Queries

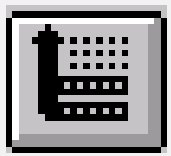
Viewing the Results

When a Query has been performed, those records who meet the criteria will be highlighted in the default selection color of yellow

Attributes of Sherbclu.shp

Shape	Statefips	Countyfips	Tract	Farm	Clunumber	Calcacres	Hel	Uid	Comments
Polygon	27	141	1681	1170	2	3.09	N		
Polygon	27	141	1681	1170	1	4.38	N		
Polygon	27	141	1682	2533	0	1.43			
Polygon	27	141	1682	2533	0	1.97			
Polygon	27	141	1682	2533	1	77.09	N		
Polygon	27	141	6790	2318	0	34.79			
Polygon	27	141	6791	2793	2	2.22	N		

The Promote Button will move the selected records to the top of the Attribute Table for easy access

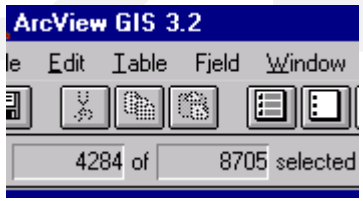


ArcView Training

Queries

Viewing the Results

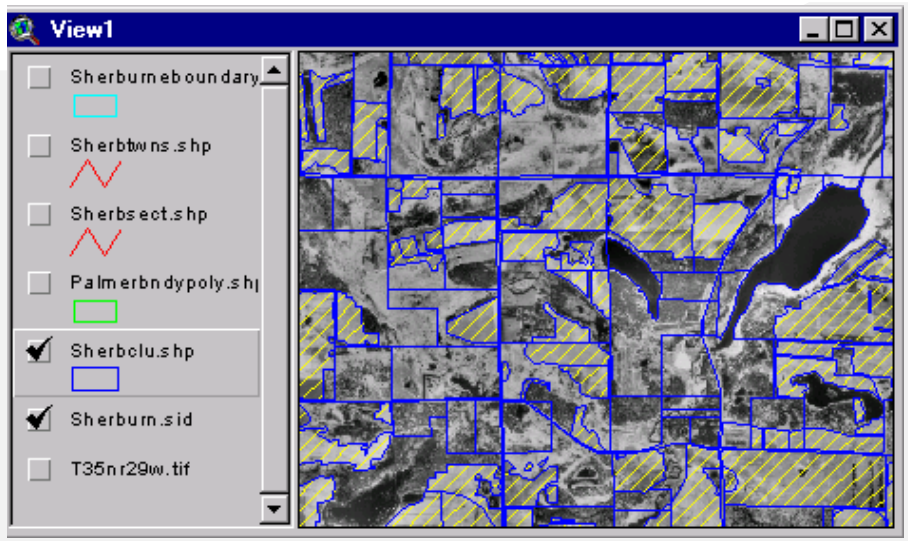
The number of selected records from the Query, and the number of total records are displayed in the tool bar area of the Attribute Table Interface



Selected features highlighted in the Attribute Table are also highlighted in the View

Attributes of Sherbclu.shp

Shape	Statefips	Countyfips	Tract	Farm	Clunumber	Calcacres	Hel
Polygon	27	141	1681	1170	2	3.09	N
Polygon	27	141	1681	1170	1	4.38	N
Polygon	27	141	1682	2533	0	1.43	
Polygon	27	141	1682	2533	0	1.97	
Polygon	27	141	1682	2533	1	77.09	N
Polygon	27	141	6790	2318	0	34.79	
Polygon	27	141	6791	2793	2	2.22	N
Polygon	27	141	6791	2793	0	18.29	



ArcView Training

Exercise 8 - Spatial Queries

This exercise will teach you:

- How to perform Spatial Queries on Tables

- How to integrate Tabular and Spatial Queries

ArcView Training

Queries

Spatial Queries

- ArcView has some limited Spatial Query capabilities
- They are an essential component of GIS software
- They use geography to determine where features of interest are in relation to other features
- Spatial Queries have some limitations

ArcView Training

Queries

Spatial Queries

They are based on “Theme on Theme” selection criteria

- Use selected features in one Theme to select features in another Theme

- Theme on Theme selection determines if spatial relationships exist between theme features

- Requires Two Themes

1) Target Theme - the theme or themes whose features are to be selected,
these are the active themes

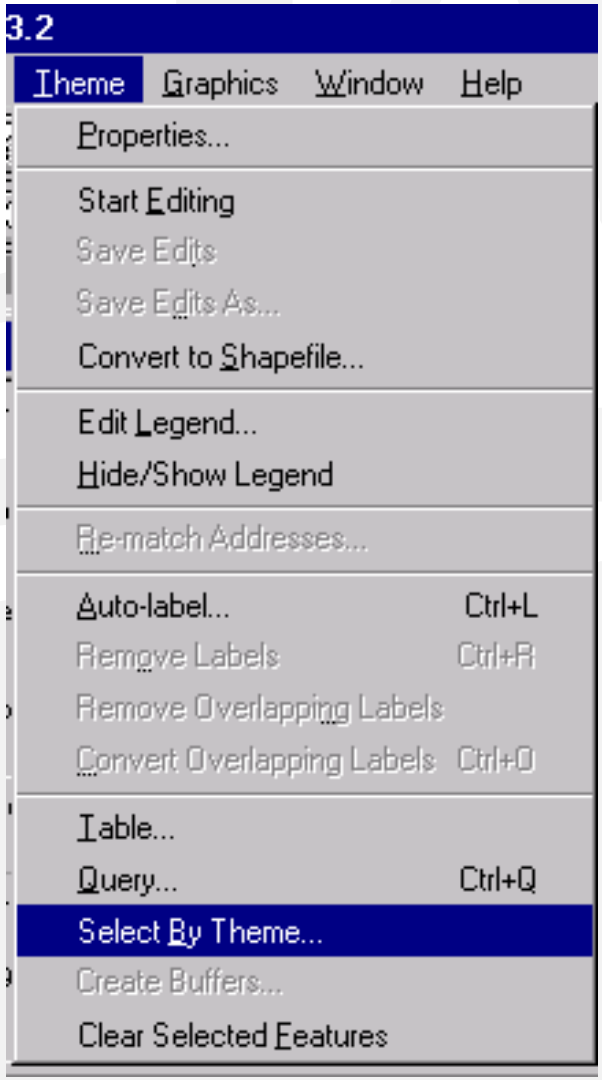
2) Selector Theme - the theme whose features are used for selection

ArcView Training

Queries

Spatial Queries

To access the Spatial Query, select the THEME menu pull-down and choose the ***Select by Theme*** option

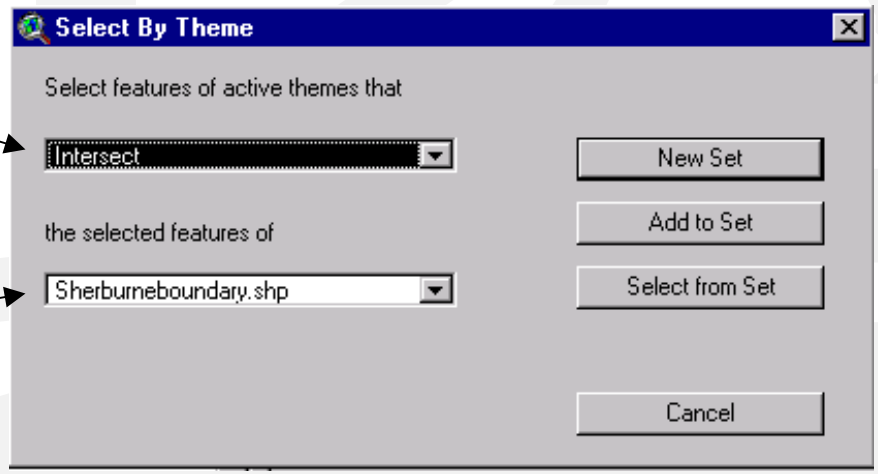


ArcView Training

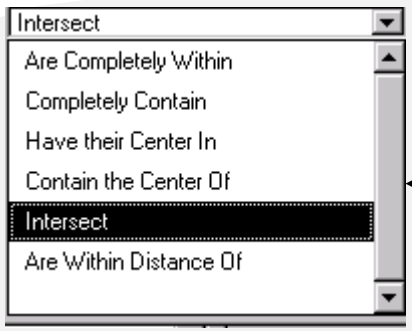
Queries

Spatial Queries

Spatial Query Options



List of Available Themes



Spatial Query Choices

ArcView Training

Six Spatial Queries

1) **Are Completely Within** - finds the features in the target theme that are completely inside the selector theme polygons

2) **Completely Contain** - finds the polygons in the target theme that fully contains the selector theme features

3) **Have Their Center In** - finds the polygon in the target theme that have their center in the selector theme polygons

4) **Contain The Center Of** - finds the polygons in the target theme that contain the center of the selector theme polygons

5) **Intersect** - finds features of the target theme which intersect the selected features of the selector theme

6) **Are Within a Distance Of** - finds features of the target theme that are within a specified distance of selected features in the selector theme

ArcView Training

Exercise 9 - The Layout Document

This exercise will teach you:

- How to Create Layout Documents
- How to Add Layout Frames
- How to Add Text to a Layout
- How to Print a Layout

ArcView Training

The Layout Document

This is used to compose and produce hardcopy maps and output products

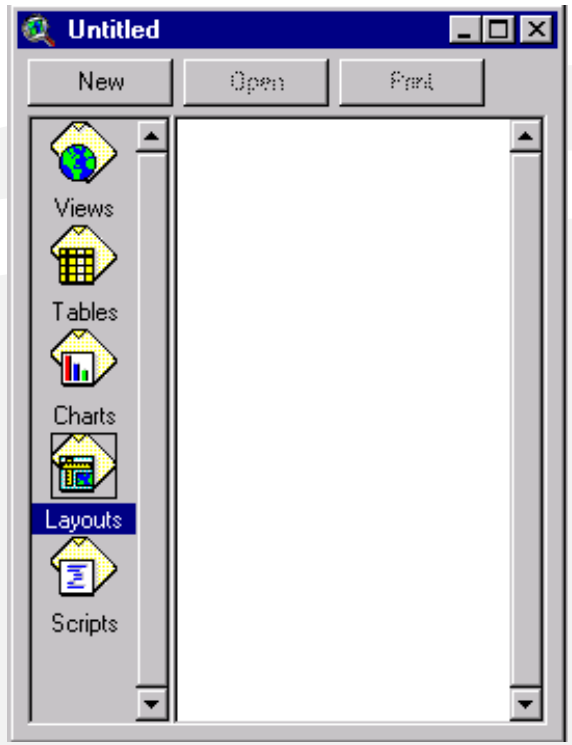
Outputs need to be designed with a specific printer and its capabilities in mind

Creating a New Layout:

- Make sure the Layout Folder is the active folder in the Project Window

- Select the New Button

- Create a new Layout for each map you make



ArcView Training

The Layout Document

Opening an Existing Layout

- Make sure the Layout Folder is active in the Project Window

- Highlight the name of the Layout you want opened

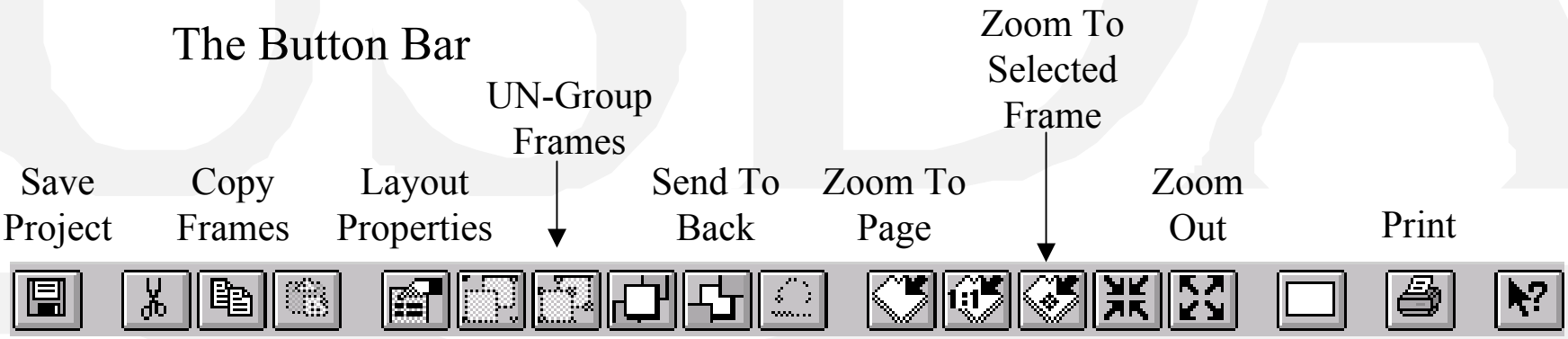
- Either press the Open Button or double click on the Layout Name

ArcView Training

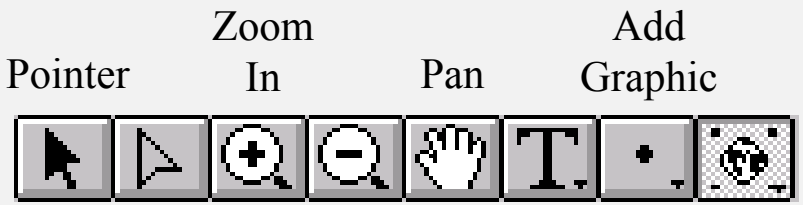
Layout

The Layout Interface

The Button Bar



The Tool Bar



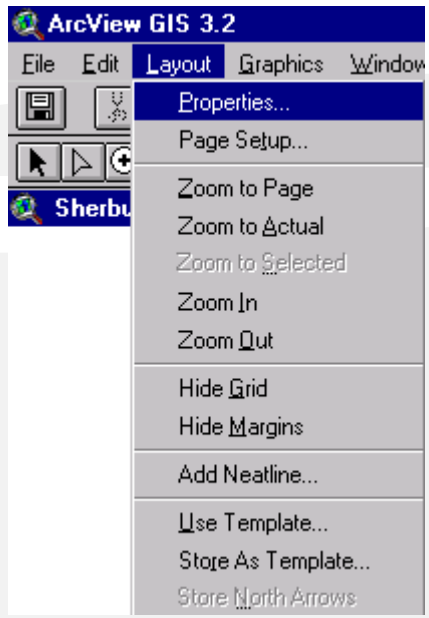
ArcView Training

Layouts

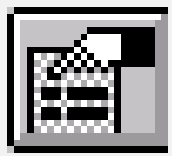
Layout Properties

Every Layout will have a Properties Sheet

- Sets the characteristics of the Grid
- Sets the Width and Height
- Sets the Snapping On or Off



Access the Property Sheet through the LAYOUT menu pull-down and select the ***Properties*** option or click on the Layout Properties Button



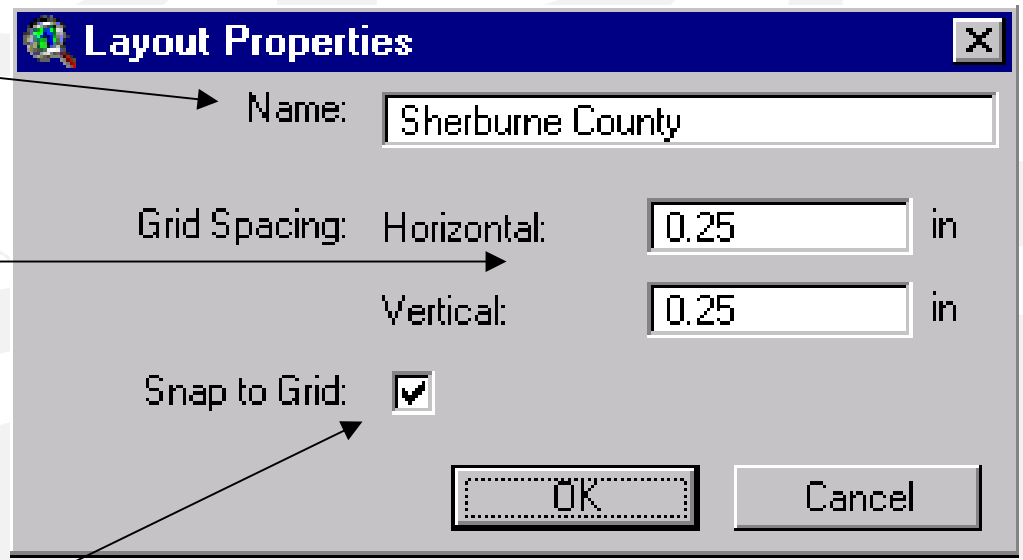
ArcView Training

Layout

Layout Properties

Name Layout Here

Change Grid Spacing



Turn Grid Snapping On or Off

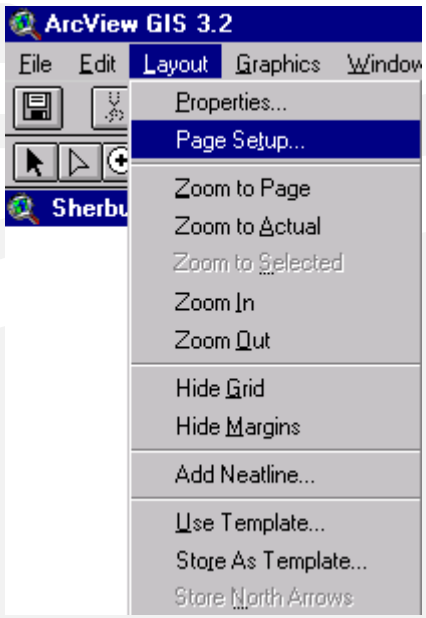
ArcView Training

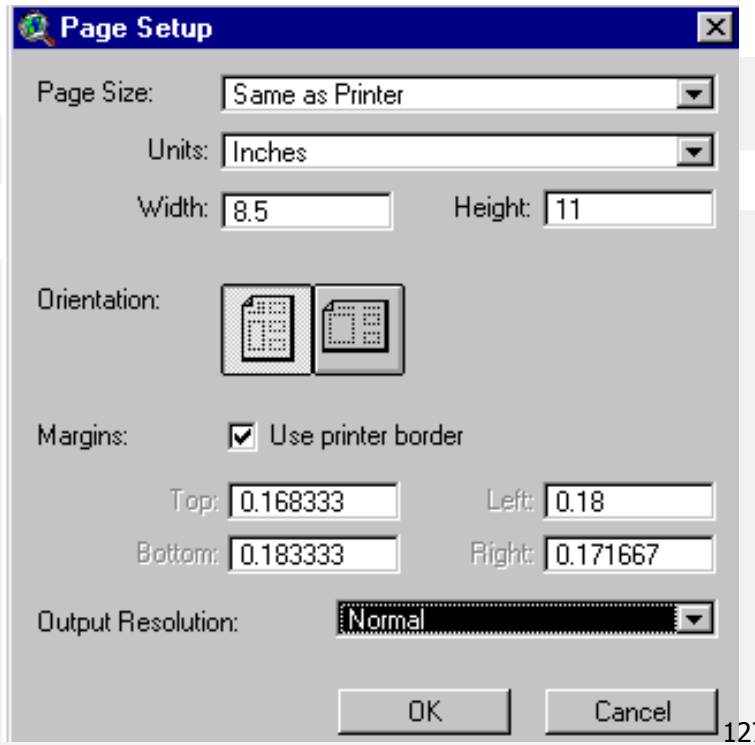
Layout

Layout Properties

You can also alter the page settings of your layout

To access this select the LAYOUT menu pull-down and select the ***Page Setup*** option





ArcView Training

Layouts

Creating Layouts

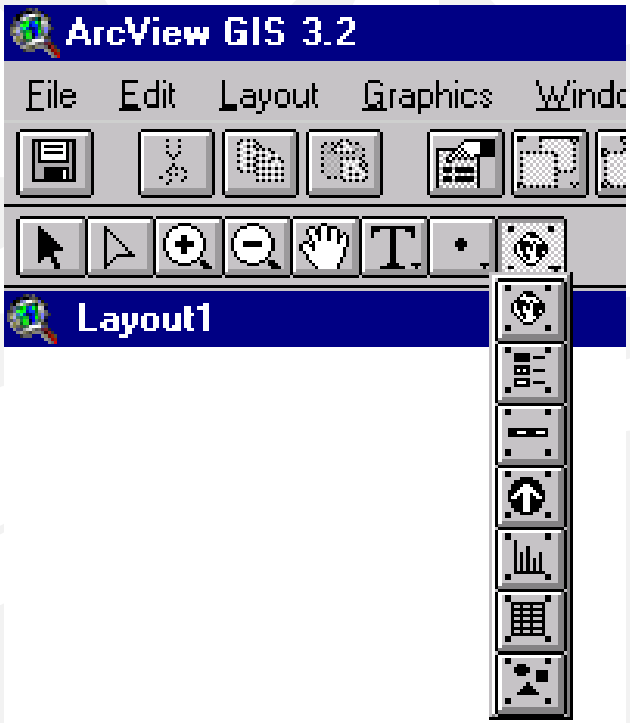
- Layouts are created by placing components of information you want displayed in the Layout
- Components are also referred to as “Frames” that contain a variety of objects
- Frames are placed as rectangles on the screen using the mouse to click and drag its extent
- Frames can be Moved, Deleted, and Resized
- Copy and Paste can be used along with the clipboard

ArcView Training

Layout

Building Layouts

There is a Frame Tool that has a pull-down menu. There are seven choices for different types of frame tools.



1) View Frame - Adds a View
2) Legend Frame - Adds a Legend
3) Scale Bar Frame - Adds a Scale Bar
4) North Arrow Frame - Adds a North Arrow
5) Chart Frame - Adds a Chart
6) Table Frame - Adds a Table
7) Picture Frame - Adds an Image

ArcView Training

Layout

Adding Frames

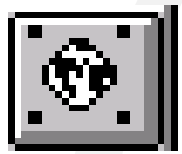
- Make sure you are in the Layout Document
- Select the Frame Tool desired
- Click and drag mouse from upper right corner to lower left of the desired location
- Respond to the Frame Property Sheet as needed for each type of Frame

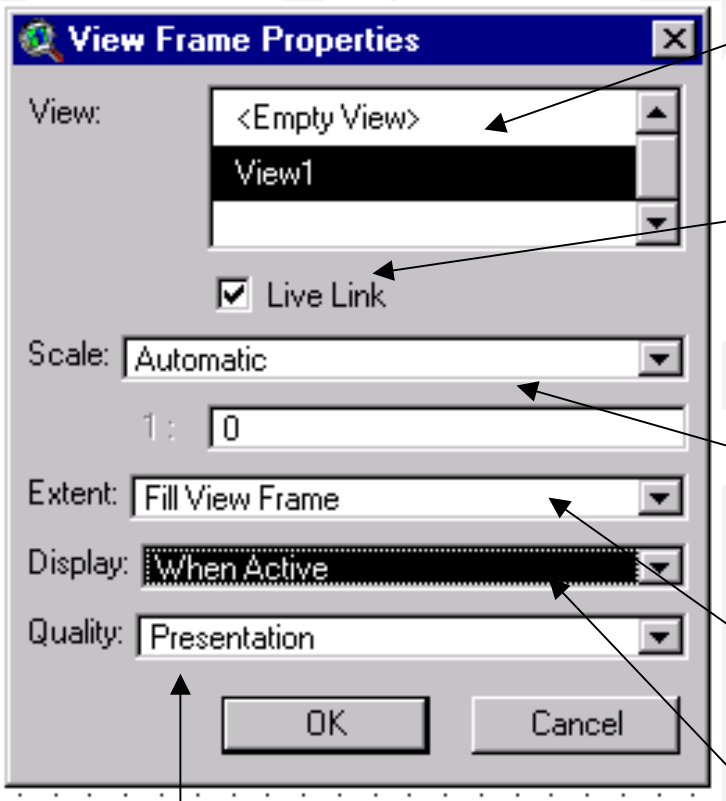
ArcView Training

Layouts

View Frame Tool

- Places a View (map) on the Layout Page





Choose the View wanted to be displayed

- Lists all the Views in an ArcView Project

Turn the Live Link on or off here

- Leaving it on will allow whatever changes are made in the View Document, to be reflected in the View Frame in the Layout

Select the Scale definitions, Three Types

- Automatic - Let ArcView calculate
- Preserve View Scale - Kept from the View Document
- User Specified - Scale specified by User

Select the Extent Options

- Fill View Frame or Clip To View

Select the Quality Options

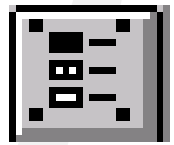
- Presentation or Draft

Select the Display Options

- When Active or Always

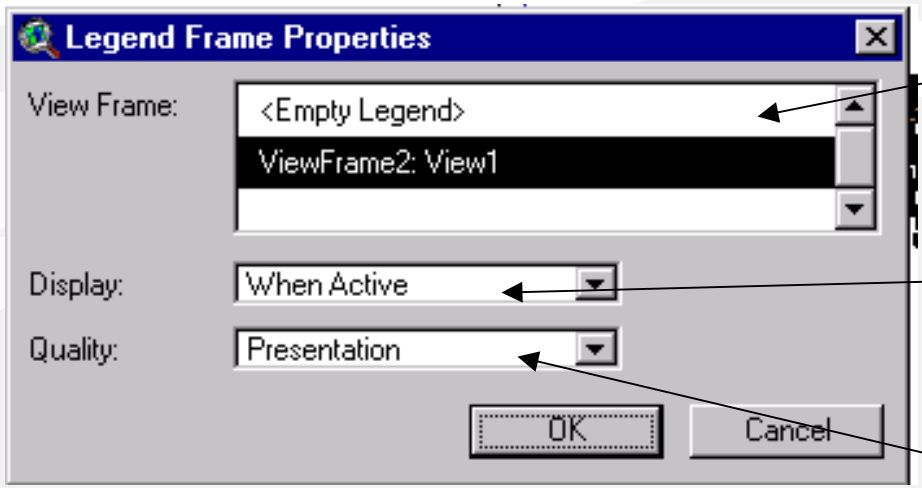
ArcView Training

Layout



Legend Frame Tool

- Places a Legend on the Layout Page
- All Legends will be attached to a View Frame
- Changes in the View's Legend will be reflected in the Layout Legend
- Theme Names in the View Document are displayed in the Layout Page



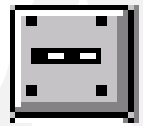
Select the View Frame of the Legend you want to show

Choose Display Option
- Always or When Active

Choose Quality Option
- Presentation or Draft

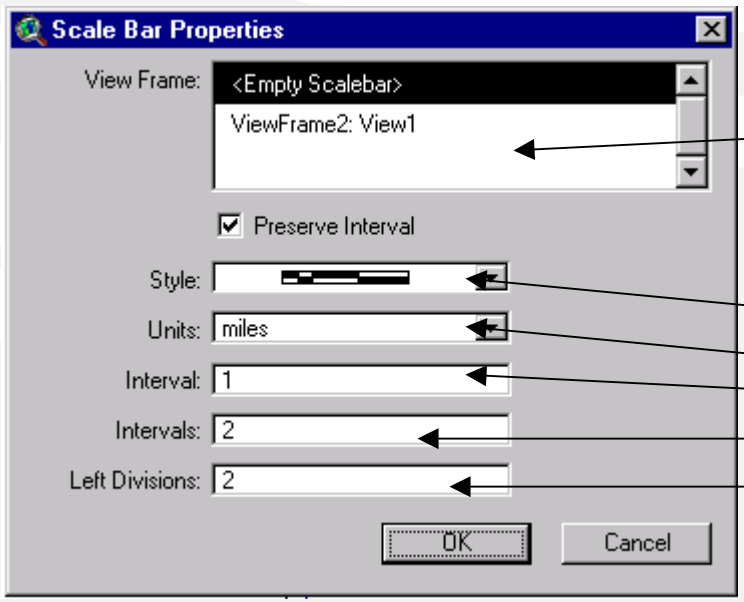
ArcView Training

Layout



Scale Bar Frame Tool

- This is dynamically linked to the View Frame Scale
- Always make sure that your View Map units is properly set
  - Click the VIEW menu pull-down and select the *Properties* option
- There are many types of Scale Bars to choose from
- You could use a Representative Fraction Scale Bar which uses words instead of graphics



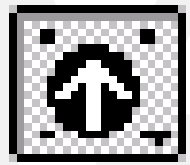
Choose the view you want the Scale Bar to be from

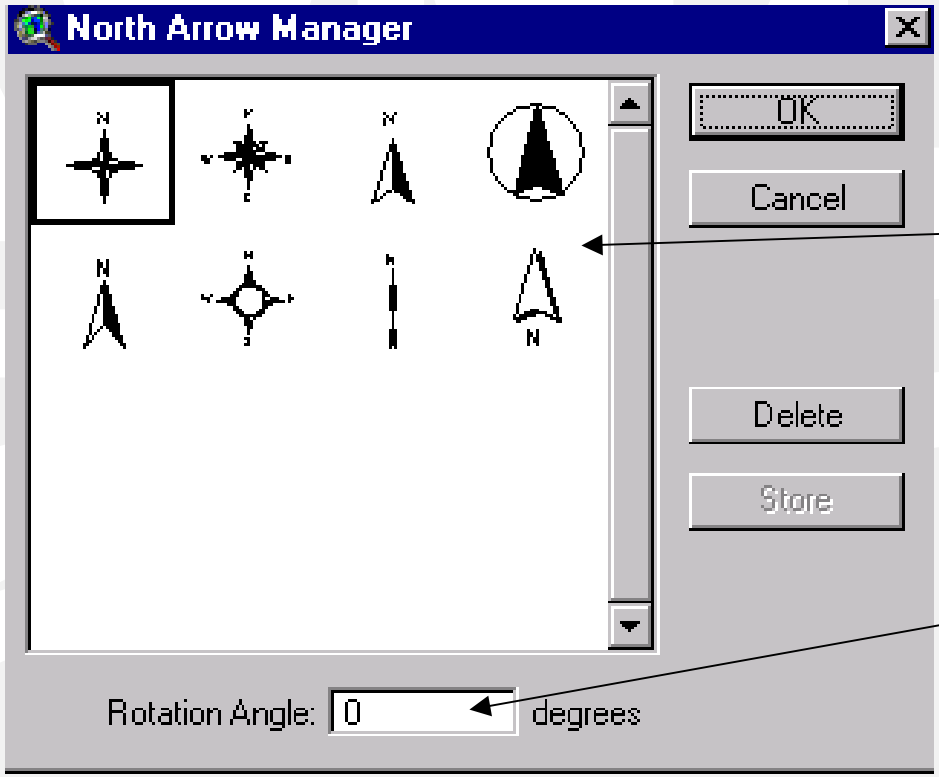
Choose the Style of the Scale Bar
Choose the Units of the Scale Bar
Choose the Right Interval Distance on the Scale Bar
Choose the Number of Intervals on the Scale Bar
Choose the Number of Left Division on the Scale Bar

ArcView Training

Layout

North Arrow Frame Tool



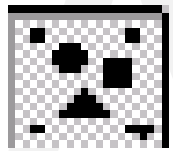


Choose a style for your North Arrow

You can indicate an Arrow Rotation to change the position that north is on the Layout

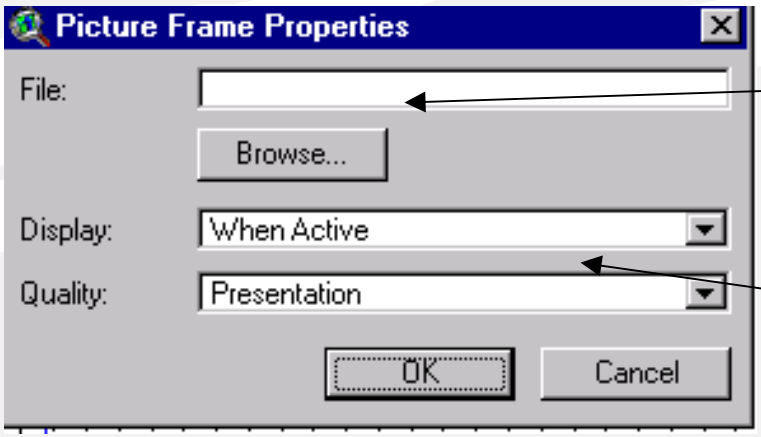
ArcView Training

Layout



Picture Frame Tool

- Used to display graphic from files created in other types of software or scanned photos
- May require more Printer Memory



Type or Browse to the location of the file

Select your Display and Quality Options

ArcView Training

Layout

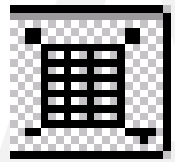
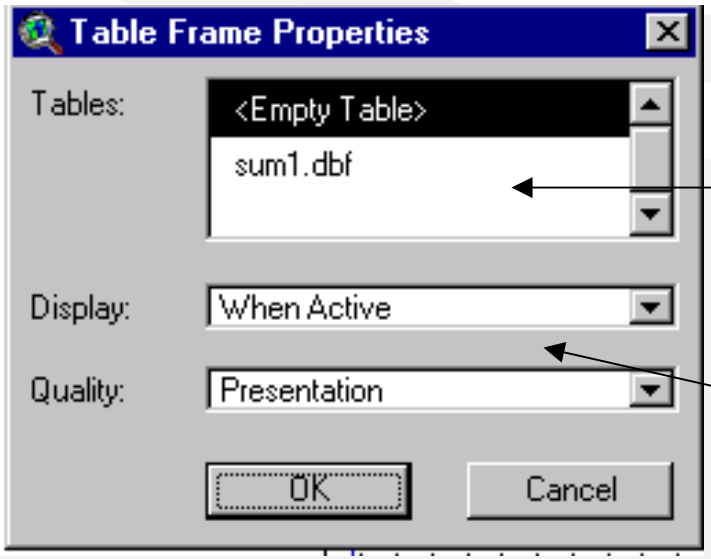


Table Frame Tool

- Use to display Tables from Themes or other Tables from the Files Directory
- The Table must be Added to the ArcView Project in the Table Document



Select the Table to be Added to the Layout

Select the Display and Quality Options

ArcView Training

Layout

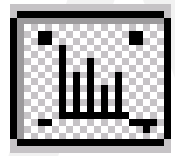


Chart Frame Tool

- This Tool will place Charts in the Layout
- The charts are created in the Charts Document of ArcView

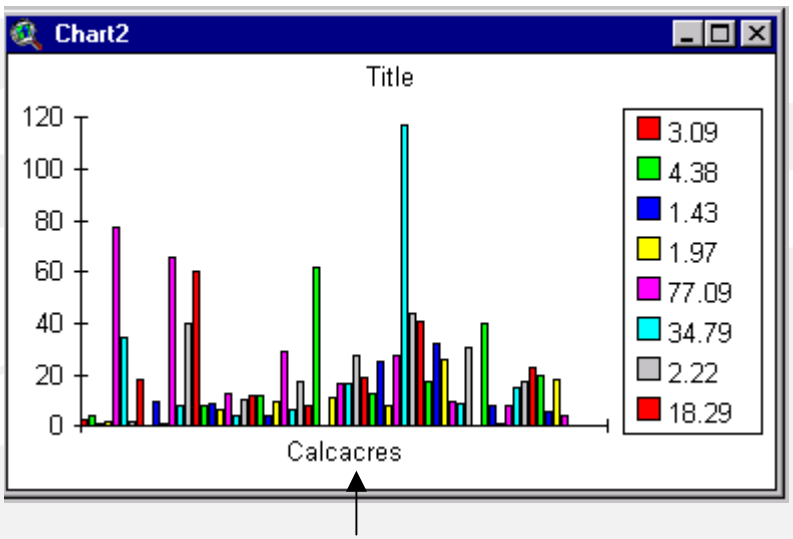
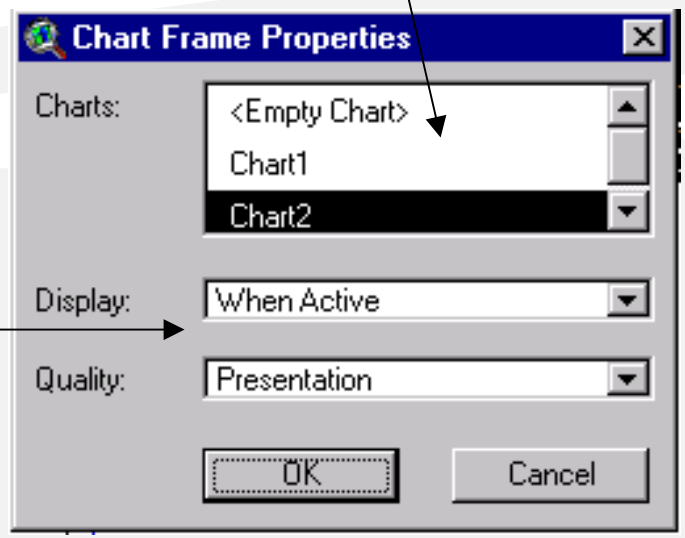


Chart Showing Acres of Fields

Choose the Chart to Display

Select the Display and Quality Options



ArcView Training

Layout

Modifying the Frames

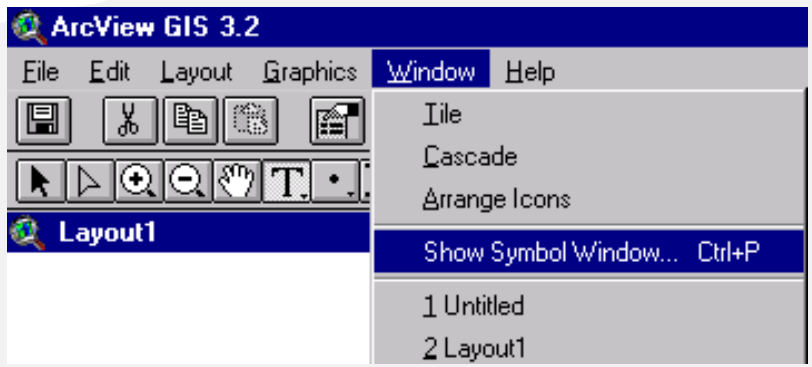
- You can modify any of the Frames by using the Selection Pointer Tool and clicking on a Frame to make it active
- Then you can Resize or Move the Frame using the Handles that appear
- A double click will display that Frames Property Sheet, edit as needed

ArcView Training

Layout

Adding Titles and Text to the Layout

- Use the Text Tool to place various types of text elements you want on your layout
- You can change the text size, style, and font by using the Palette Manager
- Access it through the WINDOW menu pull-down in the Layout Document and select the ***Show Symbol Window*** option



ArcView Training

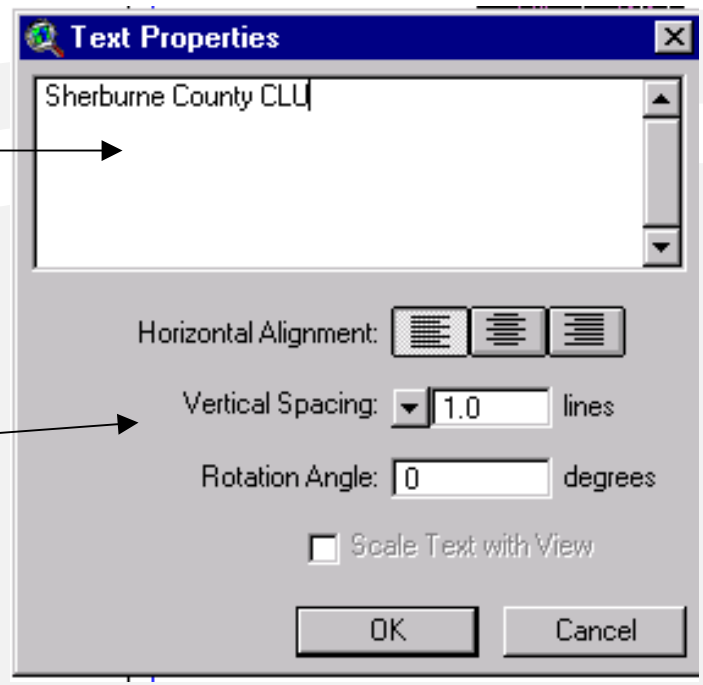
Layout

Adding Titles and Text

- To add text, make the Text Tool Active and click on the Layout where you want the text to appear
- A Text Property Box will appear

Type your Title or Text in here

Select your Alignment, Spacing, and Angle



ArcView Training

Layout

Layout Tips

- Do not make your Layout too complex!
  - Make more maps instead of cluttering one

- Put the Date and Layout Name somewhere on the Layout
  - Better if it is part of the map itself
  - Good to know where the map came from and when it was constructed

- When satisfied with the Layout, unlink the View Frame in the Layout from the View
  - Allows you to create more layouts without changing the Frames on the first Layout

- Locator maps are a good idea to help people know where they are

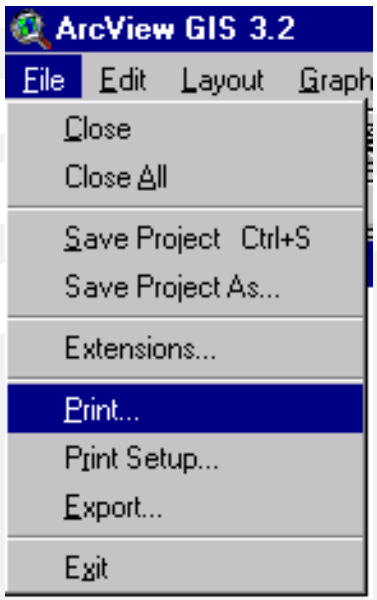
- It is helpful to place North Arrows, Scale Bars, Legends, Titles, Dates, Neatlines, and Sources on maps

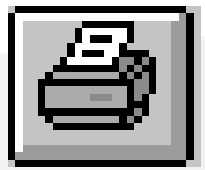
ArcView Training

Layouts

Printing Layouts

- To Print your Layout go to the FILE menu pull-down and select the ***Print*** option or just click on the Print Button



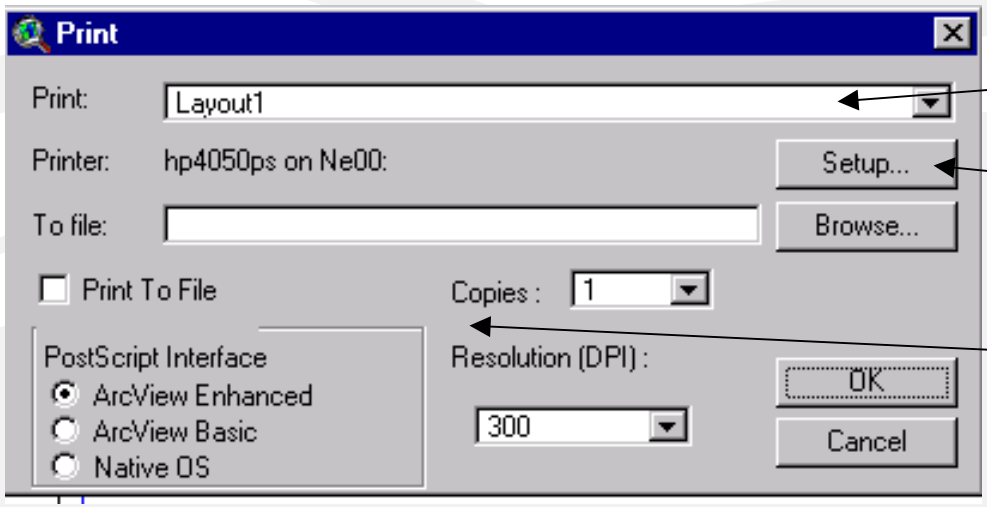


ArcView Training

Layout

Printing Layouts

- A Print Dialog Box will come up
- Fill in the needed information and click OK so it will Print



Select the Layout you want to Print

Setup or change Printers

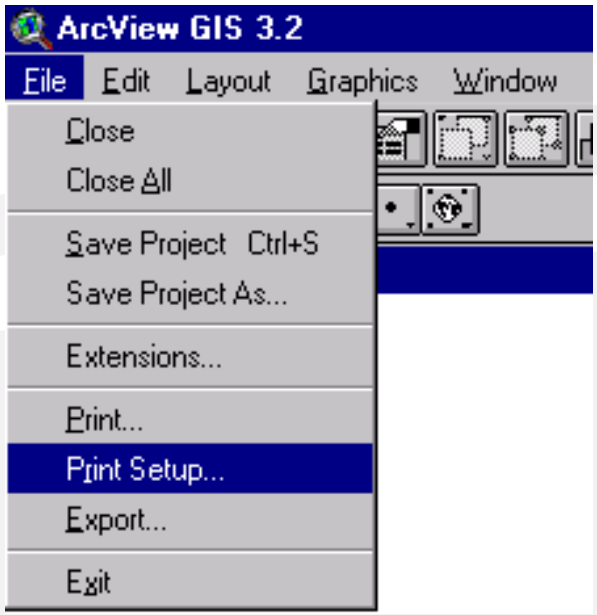
Select the other parameters

ArcView Training

Printer

Printer Setup

- To setup a Printer click on the Printer Button and select Setup or go to the FILE menu pull-down and select the ***Print Setup*** option



ArcView Training

Printing

Printer Setup

-To setup the Printer you must choose the name of the printer being Printed to and the Size, Source, and Orientation of the paper.